

DOE/NE-ID-11150
Revision 1
November 2004



U.S. Department of Energy
Idaho Operations Office

**Group 2 Remedial Design/Remedial Action
Work Plan Addendum 2 for the TSF-09/18
V-Tanks and Contents Removal, Phase 1
Contents Treatment, and Site Remediation
at Test Area North, Waste Area Group 1,
Operable Unit 1-10**



Idaho National Engineering and Environmental Laboratory

**Group 2 Remedial Design/Remedial Action Work Plan
Addendum 2 for the TSF-09/18 V-Tanks and Contents
Removal, Phase 1 Contents Treatment, and Site
Remediation at Test Area North, Waste Area Group 1,
Operable Unit 1-10**

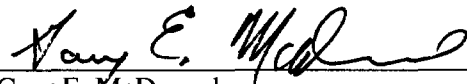
November 2004

Prepared for the
U.S. Department of Energy
Idaho Operations Office

**Group 2 Remedial Design/Remedial Action Work
Plan Addendum 2 for the TSF-09/18 V-Tanks and
Contents Removal, Phase 1 Contents Treatment, and
Site Remediation at Test Area North, Waste Area
Group 1, Operable Unit 1-10**

DOE/NE-ID-11150

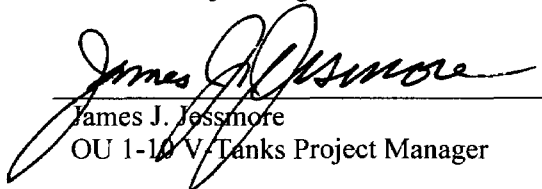
Approved by



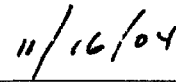
Gary E. McDannel
WAG 1 Project Engineer



Date



James J. Jessmore
OU 1-10 V-Tanks Project Manager



Date

REVISION RECORD

Rev.	Date	Description	Comments
0	September 2004	Original issue.	
1	November 2004	<p>Minor changes to various document sections to address changes to the contents removal system based on mockup testing, changes to radiological shielding for the consolidation tanks, and changes to the off gas treatment system.</p> <p>Addition of sampling after air sparging as provided by Explanation of Significant Differences (ESD) to the OU 1-10 Record of Decision, DOE/NE-ID-11199.</p>	<p>Changes to the contents removal system, radiological shielding, and off gas treatment system were determined to be “minor” as defined in Section 7.2 of this document.</p> <p>The addition of sampling after air sparging is a significant change, which will be concurred with by the Agencies through their review of the draft ESD and draft new field sampling plan. (ICP 2004h)</p>

ABSTRACT

This Remedial Design/Remedial Action Work Plan Addendum 2 (Revision 1) for the V-Tanks contents removal and Phase 1 treatment was developed to implement the selected remedy as stated in the Record of Decision Amendment for the V-Tanks (TSF-09 and TSF-18) and the subsequent Explanation of Significant Differences. The two sites addressed in this work plan are the Intermediate-Level (Radioactive) Waste Disposal System (Technical Support Facility [TSF]-09) and the Tank V-9 (TSF-18). Collectively, the sites are referred to as the V-Tanks. The two sites pose a threat to human health and the environment. The Record of Decision Amendment determined the selected remedy for the sites as soil and tank removal, ex situ treatment of tank contents, and disposal of the removed material.

This Remedial Design/Remedial Action Work Plan Addendum describes the remedial design and remedial action for tank and tank contents removal, Phase 1 treatment of tank contents, soil removal and disposal, and site backfill and restoration. If necessary, a separate Remedial Design/Remedial Action Work Plan addendum will address Phase 2 chemical oxidation treatment and disposal of the tank contents. This document also references supporting documents required to conduct this Comprehensive Environmental Response, Compensation, and Liability Act remedial action.

CONTENTS

ABSTRACT.....	iii
ACRONYMS.....	xi
1. INTRODUCTION	1
1.1 Document Organization	4
1.1.1 Remedial Design/Remedial Action Work Plan Addendum.....	4
1.1.2 RD/RAWP Addendum 2 Supporting Documents.....	6
1.2 Background	6
1.2.1 Remedial Action Sites	8
1.3 Remedial Action Approach Overview	14
2. DESIGN BASIS AND REQUIREMENTS	15
2.1 Remedial Action Objectives.....	15
2.1.1 Final Remediation Goals	16
2.1.2 HWMA/RCRA Closure.....	16
2.2 Record of Decision Remedy Implementation Approach and Performance Criteria	17
2.3 General Requirements	17
2.3.1 Regulatory Requirements	17
2.3.2 Department of Energy Orders.....	25
2.3.3 INEEL Requirements.....	25
2.3.4 Reference Documents.....	26
2.4 Design Criteria	26
2.4.1 Functional and Performance Requirements.....	26
2.4.2 Special Requirements	28
2.4.3 Engineering Design Requirements	28
2.4.4 Testing and Maintenance Requirements.....	28
2.4.5 Other General Requirements	29
2.5 Key Codes and Standards.....	29
3. UNCERTAINTY MANAGEMENT	29
4. REMEDIAL DESIGN	32
4.1 Design Overview	32
4.2 Design Assumptions.....	33

4.3	Detailed Design Description	34
4.3.1	Equipment Layout	34
4.3.2	Excavation and Tank Removal.....	34
4.3.3	Secondary Containment.....	37
4.3.4	Supernatant Removal.....	37
4.3.5	V-9 Sludge Removal.....	38
4.3.6	V-1, V-2, and V-3 Sludge Removal	38
4.3.7	Tank Rinsing.....	39
4.3.8	Consolidation Tank Assembly.....	39
4.3.9	Radiation Shield Walls	40
4.3.10	Air Sparging Equipment	40
4.3.11	V-Tank Off-Gas Assemblies	41
4.3.12	Design of Backfill.....	42
4.3.13	Design for Miscellaneous Waste Addition	42
4.4	Equipment Components and Instrument List	45
4.5	Drawings and Specifications	46
4.6	Design Calculations.....	46
5.	ENVIRONMENT, SAFETY, HEALTH, AND QUALITY	50
5.1	Environment	50
5.2	Safety and Health	51
5.3	Quality.....	51
6.	REMEDIAL ACTION WORK PLAN	51
6.1	Project Controls.....	51
6.1.1	Field Oversight and Construction Management	51
6.1.2	Protocol and Coordination of Field Oversight.....	52
6.1.3	Project Cost Estimate.....	52
6.1.4	Project Schedule and Deliverables	52
6.2	Remedial Action Work Tasks	53
6.2.1	Premobilization.....	53
6.2.2	Storm Water Control.....	54
6.2.3	Mobilization and Setup.....	54
6.2.4	Site Access Control.....	55
6.2.5	Tank System Release Soil Removal, Sampling, and Risk Assessment (Contingency Task)	55
6.2.6	Phase 1 Soil Excavation.....	56
6.2.7	System Mockup Testing	57
6.2.8	Management Self-Assessment.....	57
6.2.9	Prefinal Inspection – Part 1.....	58

6.2.10	Equipment Installation.....	58
6.2.11	System Operability and Leak Testing.....	59
6.2.12	Removal of Tank Contents and Waste Consolidation Operation	59
6.2.13	Phase 1 Treatment (Air Sparging)	64
6.2.14	Confirmation of Noncharacteristic Determination	64
6.2.15	Soil Confirmation Sampling and RCRA Closure Sampling.....	65
6.2.16	Phase 3 Soil Removal	67
6.2.17	Prefinal Inspection – Part 2.....	68
6.2.18	Backfill	68
6.2.19	Revegetation	68
6.2.20	Waste Transport to ICDF.....	68
6.2.21	Demobilization and Decontamination	69
6.2.22	Waste Management and Disposal.....	69
6.2.23	Site Access and Institutional Controls.....	70
6.2.24	Records and As-Builts	70
6.2.25	Prefinal Inspection – Part 3.....	70
6.3	Agency Inspections	71
6.3.1	Prefinal Inspection.....	71
6.3.2	Final Inspection	73
6.4	Remedial Action Report.....	73
6.5	Supporting Documents	74
6.5.1	Field Sampling Plan for Soil Sampling	74
6.5.2	Phase 1 Treatment Field Sampling Plan	74
6.5.3	Waste Management Plan	75
6.5.4	Decontamination Plan.....	75
6.5.5	Health and Safety Plan.....	76
6.5.6	Institutional Control Plan.....	76
6.5.7	Operations and Maintenance Plan	76
6.5.8	Spill Prevention and Response Program.....	77
6.5.9	Work Planning Documentation	77
6.5.10	HWMA/RCRA Closure Plan and Associated Field Sampling Plan.....	77
6.5.11	Risk-Based Screening and Assessment Approach for Waste Area Group 1 Soils	77
7.	CHANGES TO REMEDIAL DESIGN/REMEDIAL ACTION DOCUMENTS	78
7.1	Changes to OU 1-10 V-Tanks RD/RA Scope of Work.....	78
7.2	Control of Changes to RD/RAWP Addenda	78
8.	FIVE-YEAR REVIEWS.....	79
9.	REFERENCES	79

Appendix A—Applicable or Relevant and Appropriate Requirements Implementation.....	A-1
Appendix B—ARA-16 Source Term Calculations.....	B-1
Appendix C—Cost Estimate for Remedial Action	C-1
Appendix D—Safety Category Evaluation.....	D-1
Appendix E—Agency Comment Resolution Forms.....	E-1
Appendix F—Miscellaneous Figure	F-1
Attachment 1—TAN V-Tanks Design Drawings.....	Att-1-1
Attachment 2—TAN V-Tanks Design Specifications (SPC-555 Abridged).....	Att-2-1
Attachment 3—Project Calculations and Analyses	Att-3-1
Attachment 4—Air Permitting Applicability Determination (APAD 04-53).....	Att-4-1

FIGURES

1. Location of the Idaho National Engineering and Environmental Laboratory Site.....	7
2. V-Tank sites at Test Area North	9
3. Primary waste sources and relationship among remedial sites	10
4. Decision diagram for RCRA closure and confirmation sampling	66
5. Simplified process flow diagram for prefinal inspection reports	72

TABLES

1. Waste Area Group 1, Operable Unit 1-10 sites requiring remedial action or limited action in the original Record of Decision	1
2. Scope Summary for Group 2 Remedial Design/Remedial Action Work Plan and addendum documents	3
3. V-Tank capacities and current contents	11
4. Remedy implementation approach and performance criteria	18
5. Identification and mitigation of remedial action uncertainties.....	30
6. Key equipment needed for excavation and tank removal	35
7. Miscellaneous waste items for inclusion into the V-Tank waste	43
8. Concentrations of key components following miscellaneous waste consolidation (EDF-4928).....	45
9. Key equipment needed for waste consolidation and Phase 1 treatment	45
10. Design drawings.....	46
11. Design specifications	49
12. Key design calculation summary	50
13. Deliverable schedule for the V-Tank/contents removal and site remediation	52

ACRONYMS

ALARA	as low as reasonably achievable
AOC	area of contamination
ARAR	applicable or relevant and appropriate requirement
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DCE	dichloroethene
DEQ	Idaho Department of Environmental Quality
DOE	U.S. Department of Energy
DOE Idaho	U.S. Department of Energy Idaho Operations Office
DOP	di-octyl phosphate
EPA	U.S. Environmental Protection Agency
ESD	Explanation of Significant Differences
FFA/CO	Federal Facility Agreement and Consent Order
FRG	final remediation goal
FSP	field sampling plan
GAC	granular activated carbon
HASP	Health and Safety Plan
HDPE	high-density polyethylene
HEPA	high-efficiency particulate air
HIC	high-integrity container
HWD	hazardous waste determination
HWMA	Hazardous Waste Management Act
ICDF	INEEL CERCLA Disposal Facility
IDAPA	Idaho Administrative Procedures Act
INEEL	Idaho National Engineering and Environmental Laboratory
LDR	land disposal restriction
M&O	management and operation
MCP	management control procedure

MSA	management self-assessment
NESHAP	National Emission Standards for Hazardous Air Pollutants
OSHA	Occupational Safety and Health Act
OU	operable unit
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PRD	program requirements document
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RD/RA	remedial design/remedial action
RD/RAWP	Remedial Design/Remedial Action Work Plan
RI/FS	remedial investigation/feasibility study
ROD	Record of Decision
S-GAC	sulfur-impregnated granular activated carbon
SO	system operability
SVOC	semivolatile organic compound
TAN	Test Area North
TBC	to be considered
TCE	trichloroethene
TCLP	toxicity characteristic leaching procedure
TFR	technical and functional requirements
TSCA	Toxic Substances Control Act
TSF	Technical Support Facility
UHC	underlying hazardous constituent
VOC	volatile organic compound
WAC	waste acceptance criteria
WAG	waste area group
WMP	Waste Management Plan

Group 2 Remedial Design/Remedial Action Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal, Phase 1 Contents Treatment, and Site Remediation at Test Area North, Waste Area Group 1, Operable Unit 1-10

1. INTRODUCTION

In accordance with the *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory* (DOE-ID 1991) between the U.S. Department of Energy (DOE) Idaho Operations Office, U.S. the Environmental Protection Agency (EPA), and the Idaho Department of Environmental Quality (DEQ) (hereafter referred to as the Agencies), the DOE submits this Remedial Design/Remedial Action Work Plan (RD/RAWP) Addendum 2 (Revision 1) for the Group 2 sites at Test Area North (TAN). Under the current remediation management strategy outlined in the Federal Facility Agreement and Consent Order (FFA/CO), the location identified for remedial action is designated as Waste Area Group (WAG) 1, Operable Unit (OU) 1-10 at the Idaho National Engineering and Environmental Laboratory (INEEL).

As part of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC 9601 et seq.), the release sites at TAN OU 1-10 were evaluated through the *Comprehensive Remedial Investigation/Feasibility Study for the Test Area North Operable Unit 1-10 at the Idaho National Engineering and Environmental Laboratory* (DOE-ID 1997). The Remedial Investigation/Feasibility Study (RI/FS) assessed the investigations previously conducted for WAG 1, thoroughly investigated the sites not previously evaluated, and determined the overall risk posed by the WAG. The *Final Record of Decision for Test Area North, Operable Unit 1-10* (DOE-ID 1999), which followed completion of the OU 1-10 RI/FS, identified eight sites requiring remedial action and the specific remedies for each. To facilitate remediation, and as agreed to by the Agencies, the eight sites requiring remediation in WAG 1 are divided into three groups. The sites included in each group are presented in Table 1.

Table 1. Waste Area Group 1, Operable Unit 1-10 sites requiring remedial action or limited action in the original Record of Decision.

Group	Sites
1	TSF-06, Area B, Soil Contamination Area South of the Turntable, TSF-07 Disposal Pond, WRRTF-13 Fuel Leak Site, and TSF-26 Surface Soil Contamination
2	TSF-09 and TSF-18 V-Tanks (addressed in this document)
3	TSF-26 PM-2A Tanks, TSF-03 Burn Pit, and WRRTF-01 Burn Pits.

TSF = Technical Support Facility

WRRTF = Water Reactor Research Test Facility

This RD/RAWP Addendum addresses Group 2, TSF-09 and TSF-18 V-Tanks.

Remedial action for the TAN V-Tanks, which was addressed in the Record of Decision (ROD) (DOE-ID 1999) and in the subsequent *Comprehensive Remedial Design/Remedial Action Work Plan for the Test Area North, Waste Area Group 1, Operable Unit 1-10, Group 2 Sites* (DOE-ID 2002), identified the following remedial approach:

- Soil and tank removal
- Ex situ treatment of tank contents
- Disposal of the excavated soils, removed materials (including tanks, ancillary equipment), and treated waste.

During development of the original RD/RAWP (DOE-ID 2002), two areas of change were identified. Therefore, the *Explanation of Significant Differences for the Record of Decision for the Test Area North Operable Unit 1-10* was issued ([DOE-ID 2003a](#)), which addressed further characterization of the V-Tank area of contamination and its boundaries, and revised Applicable, or Relevant and Appropriate Requirements (ARARs) for polychlorinated biphenyl (PCB) remediation waste.

Subsequently, the first addendum to the RD/RAWP, *Comprehensive Remedial Design/Remedial Action Work Plan Addendum for V-Tanks Early Remedial Action for the Test Area North, Waste Area Group 1, Operable Unit 1-10, Group 2 Sites* ([DOE-ID 2003b](#)), was written to address early removal actions for isolation of the V-Tanks, removal of a sand filter, and further sampling, which led to the inclusion of the adjacent soils that surround the former location of the TSF-21 (Valve Pit 2).

During the development of this workplan addendum, waste was identified that should be managed as PCB bulk product waste under the Toxic Substances Control Act. Therefore the alternative storage requirements approved by EPA on June 19, 2002 for this non-liquid PCB wastes has been added as a requirement. Storage under these alternative storage requirements shall be limited to 180 days unless sufficient rationale is provided to extend that time.

In accordance with the 1999 ROD, the V-Tanks are also subject to closure under the State of Idaho Hazardous Waste Management Act (HMTA). To address those requirements, a separate HMTA/Resource Conservation and Recovery Act (RCRA) closure plan was prepared that provides closure requirements—the *Hazardous Waste Management Act/Resource Conservation and Recovery Act Closure Plan for the Test Area North/Technical Support Facility Intermediate-Level Radioactive Waste Management System* ([DOE-ID 2004a](#)). Those closure requirements are also integrated into this RD/RAWP Addendum. The Closure Plan (DOE-ID 2004a) reiterates many of the features specified in previous documents. In addition, the Closure Plan and its associated Field Sampling Plan (FSP), *Field Sampling Plan for the HMTA/RCRA Closure of the TAN/TSF Intermediate Level Radioactive Waste Feed Subsystem (V-Tanks)* (INEEL 2003a), specifies that after the tanks are removed, soil from the bottom of the excavation will be sampled and analyzed for HMTA/RCRA contaminants of concern (COCs) to confirm CERCLA-derived final remediation goals (FRGs) are protective with respect to HMTA/RCRA-regulated constituents.

In addition to the V-Tanks, the Closure Plan also addresses closure actions for the TSF-21 Valve Pit and the TSF-19 Caustic Storage Tank (V-4).

The ROD (DOE-ID 1999) was amended in February 2004 as the *Record of Decision Amendment for the V-Tanks (TSF-09 and TSF-18) and Explanation of Significant Differences for the PM-2A Tanks (TSF-26) and TSF-06, Area 10, at Test Area North, Operable Unit 1-10* (DOE-ID 2004b) because the technology selected for V-Tank sludge treatment became commercially unavailable and the risk of it remaining unavailable was considered too high to proceed under the 1999 ROD. The ROD Amendment clarified the soil remediation criteria with respect to the FRGs and depth of excavation. This RD/RAWP Addendum, designated as Addendum 2 (Revision 1), addresses the implementation of some recent changes to the selected remedy. This addendum addresses: (1) the removal and consolidation of waste in the tanks, (2) removal of the tanks and piping, (3) removal of the contaminated soil, (4) site restoration, and (5) Phase 1 treatment of the sludge.

Revision 0 of this document described the design and actions needed for tank contents removal initial (Phase 1) treatment by air sparging. Final (Phase 2) treatment was to use chemical oxidation and was to be described in RD/RAWP Addendum 3. During design of the air sparging, further analysis revealed that air sparging alone at ambient or slightly elevated temperatures (up to and including boiling temperatures) has the potential to achieve the required waste treatment standards without the need for chemical oxidation. Therefore, another Explanation of Significant Differences ([DOE/NE-ID 2004c](#)) and this Revision 1 to the RD/RAWP Addendum 2 have been prepared to add sampling after Phase 1 sparging and the potential for chemical oxidation for treatment not being required. In addition, this Revision 1 addresses the minor design changes to the contents removal system that resulted from mock-up testing, radiological shielding, and the off gas treatment system.

If air sparging at ambient temperature is successful, simplified solidification of the treated waste and waste disposal will be addressed in a Revision 2 to this Addendum. If air sparging at ambient temperature does not achieve the desired treatment standards, RD/RAWP Addendum 3 will be prepared to address Phase 2 air sparging at elevated temperatures (up to and including boiling) or chemical oxidation treatment, waste stabilization, and disposal of the V-Tank waste.

Table 2 summarizes the scope of the initial RD/RAWP and the various addendums.

Table 2. Scope Summary for Group 2 Remedial Design/Remedial Action Work Plan and addendum documents.

Document	Scope	Reference
Field Sampling Plan	Sampling of Tank V-9 (completed in 2000).	DOE-ID 2000a
Group 2 RD/RAWP	Not implemented	DOE-ID 2002b
Addendum ^a	Isolating Tank V-9 and relocating the sand filter (completed in 2003 and 2004) Sampling soil to further characterize the area of contamination (AOC) surrounding the V-Tanks (completed in 2003)	DOE-ID 2003b
Addendum 2 (Revision 1)	Tank contents removal and consolidation Contaminated soil removal and disposal Tank and piping removal and disposal Site backfill and restoration Phase 1 treatment of tank contents	This document
Addendum 2 (Revision 2)	Will add provisions for simplified waste solidification and disposal (if Phase 1 sparging is successful)	Future revision to this document
Addendum 3	(If necessary) Phase 2 chemical oxidation treatment of tank contents, waste stabilization, and disposal	DOE/NE-ID 2004a ,

a. The first addendum is sometimes called "Addendum 1."

The selected remedy addresses the risks posed by the V-Tanks by effectively removing the source of contamination and breaking the pathway by which a future receptor may be exposed.

1.1 Document Organization

This section provides the outline of this RD/RAWP Addendum with appendices, attachments, and a list of the supporting documents to this RD/RAWP Addendum.

1.1.1 Remedial Design/Remedial Action Work Plan Addendum

This document presents the combined RD/RAWP for implementing the V-Tanks site remediation. The RD/RAWP Addendum 2 and its supporting documents provide details of each remediation site and its associated contaminants, design and regulatory requirements, remediation tasks, project organization, schedules, and cost estimates. Brief descriptions of the sections of this plan and the appendices follow:

Section 1 – Introduction

- This section provides the scope and purpose RD/RAWP addendum and how the scope fits under the overall OU 1-10 site remediation. In addition, this section discusses the historical and regulatory background of the V-Tanks and provides an overview of the remediation approach.

Section 2 – Design Basis and Requirements

- Remedial Action Objectives—Identifies the remedial action objectives (RAOs) for the TAN V-Tanks. This section also identifies the final remediation goals and the tank site closure requirements.
- Record of Decision Remedy Implementation Approach and Performance Criteria—Identifies the remedy elements from the OU 1-10 ROD and ROD Amendment and presents the implementation approach and performance criteria for each element.
- General Requirements—Identifies the general requirements that must be addressed and implemented in the remedial design and remedial action including ROD-applicable or relevant and appropriate requirements (ARARs), DOE Orders and Standards, and INEEL requirements.
- Design Criteria—Identifies the general project requirements, regulatory requirements, and technical and functional requirements, identifies the project specific design criteria developed to provide additional basis for the remedial design.

Section 3 – Uncertainty Management

- Identifies uncertainties and potential risks related to the remedial design and/or the remedial action and identifies measures to resolve or mitigate the risks.

Section 4 – Remedial Design

- Design Overview—General description of the overall design and summary of the design elements including process and/or work flow diagrams and identification of design analysis/calculations performed.
- Design Assumptions—General and specific assumptions that apply to the design.
- Detailed Design Description—Detailed description of each design element, equipment, component, and instrument lists, drawing and specification list.

Section 5 – Environment, Safety, Health, and Quality

- Discusses how environmental, health and safety, and quality requirements will be met through compliance with various project documents and processes.

Section 6 – Remedial Action Work Plan

- Describes the controls and protocols developed for the Group 2 remedial actions, identifies the remediation tasks, and discusses the interfaces for each remediation task. Inspection requirements and documents supporting this work plan are identified and discussed.

Section 7 – Changes to the Remedial Design/Remediation Action Scope of Work

- Identifies changes to the ROD-selected remedies and the protocol for future changes.

Section 8 – Five-Year Review

- Discusses the requirements for 5-year reviews of the remedies to ensure protectiveness of the remedies.

Section 9 – References

- Lists the references used to prepare this work plan.

Appendix A – Applicable or Relevant and Appropriate Requirements Implementation

- Provides implementation approach and strategy for the ARARs.

Appendix B – ARA-16 Source Term Calculations

- Provides the characterization data for the ARA-16 waste in the “as-found” condition, prior to dewatering.

Appendix C – Cost Estimate for Remedial Action

- Provides a cost estimate for implementation of the remedial action.

Appendix D – Safety Category Evaluation

- Summarizes the safety category evaluation(s) associated with remedial action activities and the controls necessary to safely execute the remedial action.

Appendix E – Agency Comment Resolution Forms

- Presents Agency comments and how each comment was resolved.

Appendix F – Miscellaneous Figure

- Conceptual design for Tank V-9 Macroencapsulation.

Attachment 1 – TAN V-Tanks Design Drawings

- Presents design drawings associated with implementation of the remedial action.

Attachment 2 – TAN V-Tanks Design Specifications

- Presents design specifications and requirements associated with implementation of the remedial action.

Attachment 3 – Project Calculations and Analyses

- Provides Engineering Design Files (EDFs) containing project calculations and analyses that are relevant to and/or support the design.

Attachment 4 – Air Permitting Applicability Determination

- Provides the results of the radiological and chemical air modeling performed.

1.1.2 RD/RAWP Addendum 2 Supporting Documents

Several documents have been prepared to supplement this RD/RAWP Addendum and support the implementation of the remedial action. The supporting documents include:

- *Field Sampling Plan for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10*, (ICP 2004a)
- *Waste Management Plan for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10*, (ICP 2004b)
- *Decontamination Plan for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10* ([ICP 2004c](#))
- *Health and Safety Plan for the V-Tank Area CERCLA Site Remediation at Test Area North, Waste Area Group 1, Operable Unit 1-10* (ICP 2004d). This document will be submitted to the Agencies for information only.

Revisions 0 of the aforementioned four documents were submitted to the Agencies separate from the submittal of the RD/RAWP Addendum 2. In addition, the following supporting document has been prepared and previously submitted:

- *Hazardous Waste Management Act/Resource Conservation and Recovery Act Closure Plan for the Test Area North/Technical Support Facility Intermediate-Level Radioactive Waste Management System, Phase 2: Feed Subsystem Feed Subsystem (V-Tanks)*, DOE/ID-11053, Rev. 3, July 2004 (DOE-ID 2004a).

The following supporting document is in preparation and will be submitted prior to its use:

- Field Sampling Plan for TSF-09/18 V-Tanks Phase I Treatment (ESP-122-04), ([ICP 2004h](#)).

1.2 Background

The INEEL is a DOE facility located in southeastern Idaho, 51.5 km (32 mi) west of Idaho Falls, and encompasses approximately 2,305 km² (890 mi²) of the northeastern portion of the Eastern Snake River Plain. The TAN facility is approximately a 41-ha (102-acre) area, located in the north-central portion of the INEEL Site (see Figure 1). The area originally included four different facilities: (1) the TSF, (2) the Initial Engine Test (IET) Facility, (3) the Water Reactor Research Test Facility (WRRTF), and (4) the Specific Manufacturing Capability (SMC)/Loss-of-Fluid Test (LOFT) Facility.

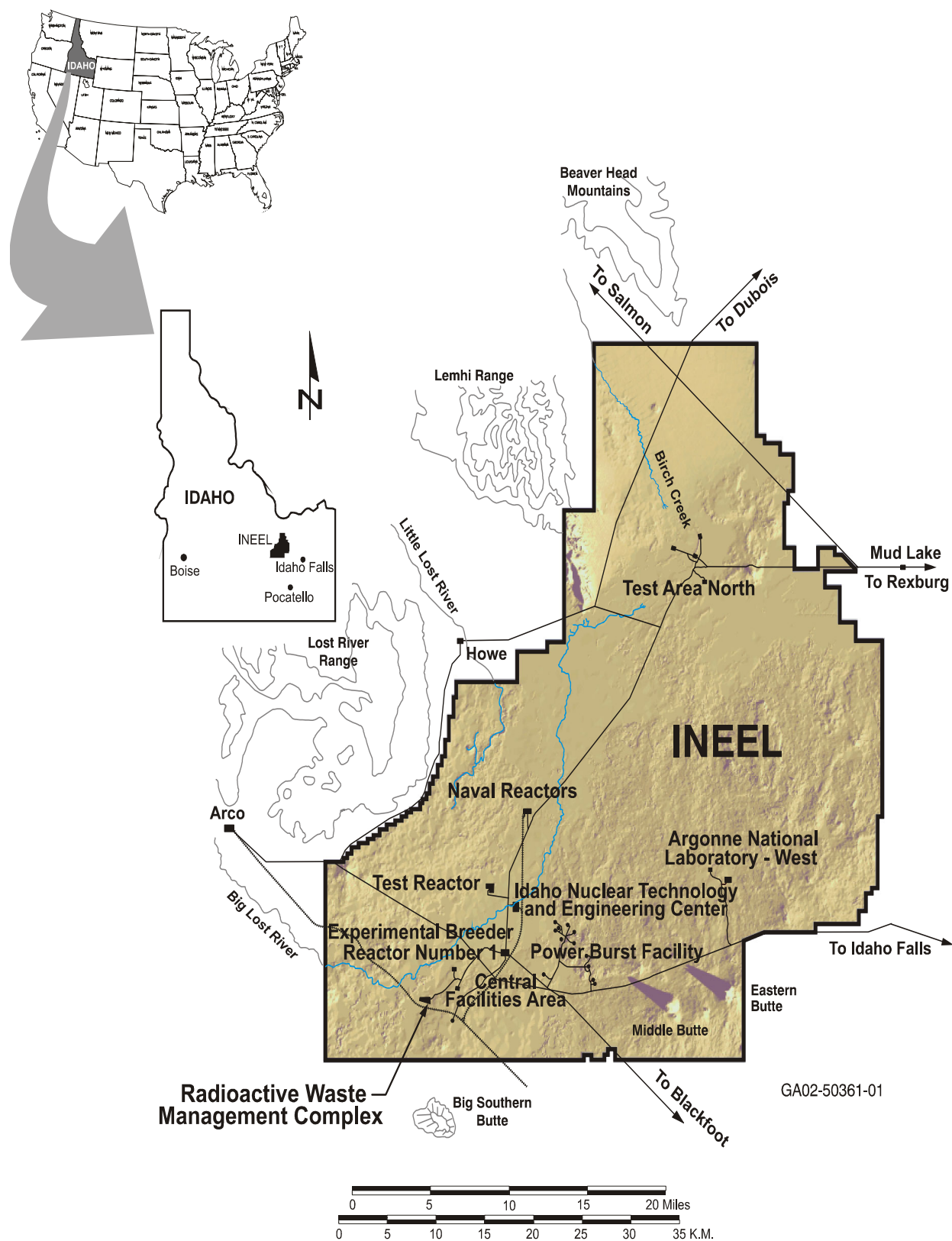


Figure 1. Location of the Idaho National Engineering and Environmental Laboratory Site.

Since its construction in 1954, TAN has supported numerous research and testing projects including development and testing of designs for nuclear-powered aircraft engines, reactor safety testing and behavior studies, armor manufacturing, nuclear inspections, and storage operations.

The TAN WAG 1 is one of 10 INEEL WAGs identified in the FFA/CO (DOE-ID 1991). Operable Unit 1-10 is listed as the WAG 1 comprehensive RI/FS in the FFA/CO. The purpose of the RI/FS was to assess the investigations previously conducted for WAG 1, thoroughly investigate the sites not previously evaluated, and determine the overall risk posed by the WAG. The final ROD for the OU 1-10 sites identifies the remedies selected for eight of these sites that might present an imminent and substantial endangerment to human health and the environment. These eight sites were initially investigated in other OUs in WAG 1 and were later incorporated into OU 1-10 for the RI/FS and ROD.

1.2.1 Remedial Action Sites

The remediation sites, TSF-09 and TSF-18 (the V-Tanks), are situated in an open area east of TAN-616 and north of TAN-607 (Figure 2). Soil contamination attributable to spills during waste handling surrounds these tanks and is considered part of each site. The area of contamination (AOC) defined by the contaminated soil is estimated at 215 ft × 96 ft. Several non-CERCLA components including the TAN-616, which was recently demolished, and TAN-633 buildings are located near the AOC.

Waste collected in the V-Tanks was transferred from the TAN-616 evaporator pit sump and pump room sump, the TAN-607 laboratory drain, the TAN-607 Warm/Hot Shop drain, and TSF-21 (Valve Pit No. 2) through the TAN-1704 Valve Pit (Valve Pit No. 1) to Tank V-9. The overflow from Tank V-9 drained to Tanks V-1, V-2, and V-3 ([INEEL 2001](#)). Figure 3 depicts the relationship of these units and the primary waste sources. The following sections provide brief descriptions of TSF-09, TSF-18 and the contaminated soil attributable to both units.

1.2.1.1 TSF-09, TSF Intermediate-Level (Radioactive) Waste Disposal System. The TSF-09 consists of three 37,860-L (10,000-gal) underground storage tanks (Tanks V-1, V-2, and V-3), ancillary lines, and surrounding contaminated soil. The tanks and associated piping were installed in 1953 and became operational in 1958. The tanks were designed to collect and store liquid radioactive waste at TAN. The waste was stored in the underground tanks and then treated in the evaporator system located in TAN-616. Residues from the TAN-616 treatment process were sent to the PM-2A Tanks at TSF-26 and the TSF injection well (condensate). In 1970, the TAN-616 evaporator system failed and all wastes were directed to the PM-2A Tanks (DOE-ID 1997). After 1975, the waste was removed from the tanks through the tank vent pipes using a sump pump. The waste was pumped into tanker trucks and shipped to the Idaho Chemical Processing Plant (INEL 1994). Tanks V-1 and V-3 became inactive in the early 1980s. Tank V-2 was taken out of service in 1968 after a large quantity of oil was discovered in the tank. The oil was removed in 1981. In 1982, some of the free liquid was removed from the V-Tanks. Additional wastewater was reportedly added to Tank V-3 through 1985. Starting in 1985, all low-level radioactive waste at TAN was rerouted to TAN-666 through a piping modification in the TAN-1704 Valve Pit. The piping modification stopped intentional discharge to the V-Tanks in 1985. There is no evidence that sludge accumulating in the tanks was removed during or after site operations (DOE-ID 1997).

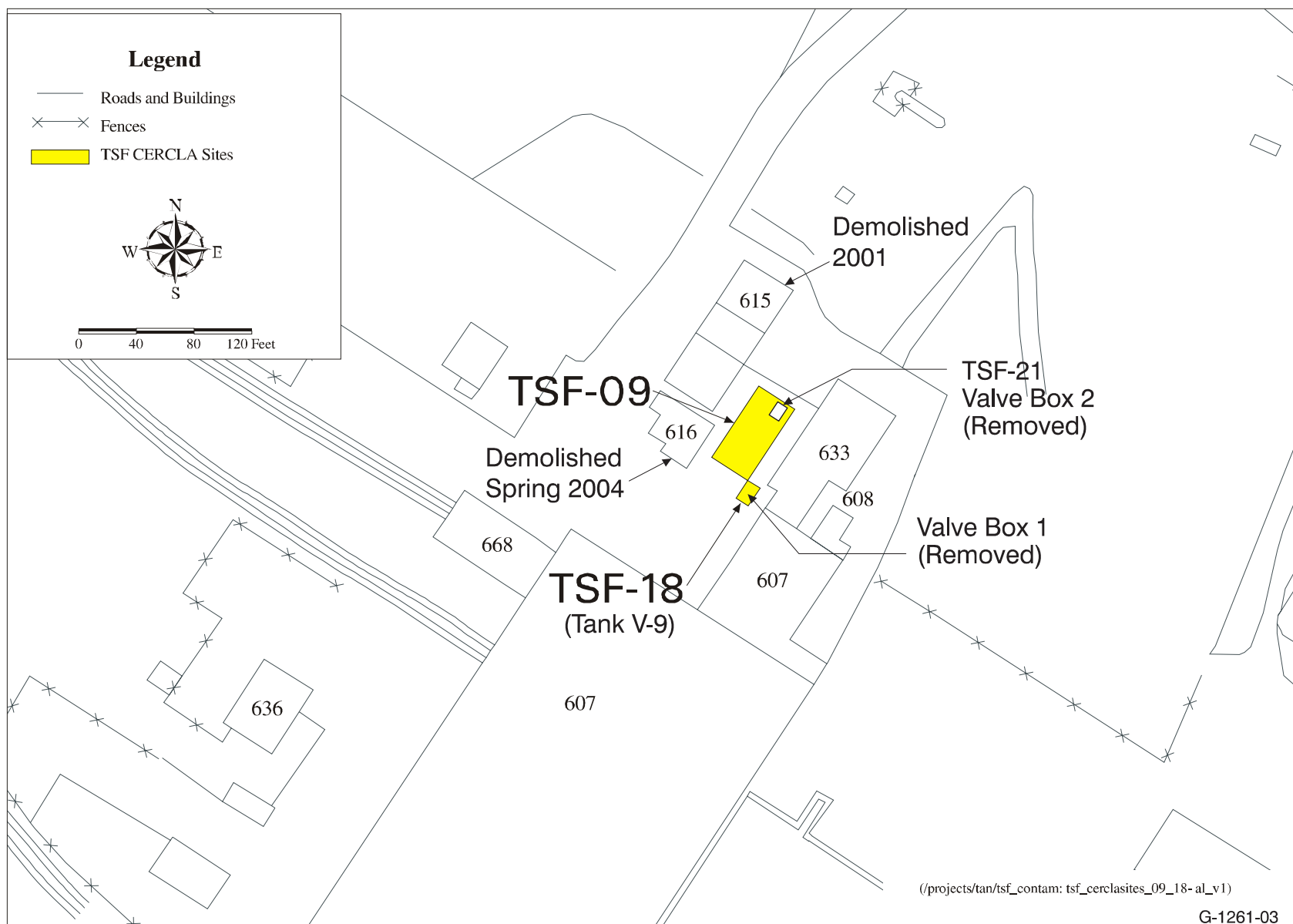
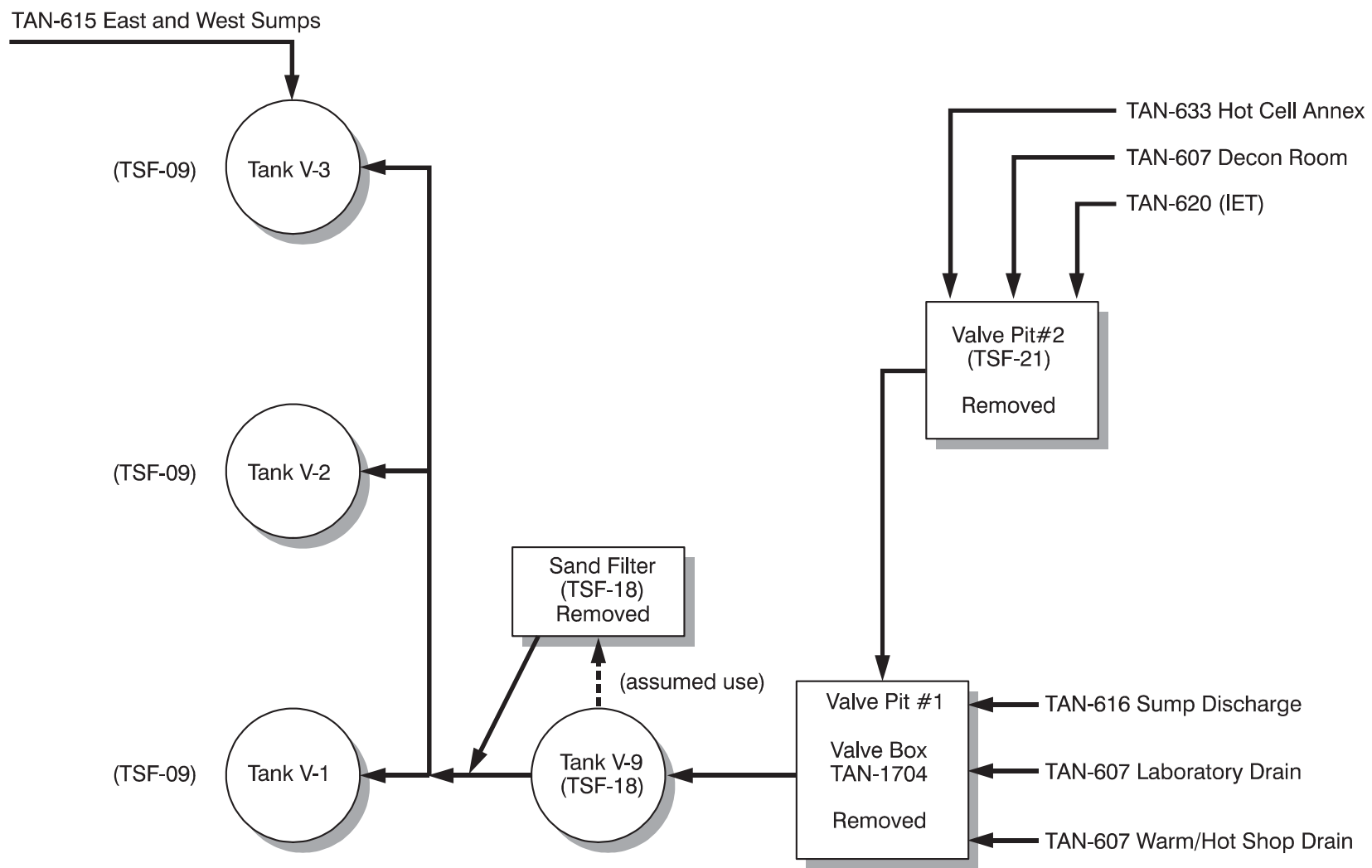


Figure 2. V-Tank sites at Test Area North.



G1240-16

Figure 3. Primary waste sources and relationship among remedial sites.

Tanks V-1, V-2, and V-3 are stainless steel tanks measuring 3 m (10 ft) in diameter, 5.5 m (19.5 ft) long, and buried approximately 3 m (10 ft) below ground surface. The tanks have 50.8-cm (20-in.) manholes that are accessible through 1.8-m (6-ft) diameter culverts installed in 1981 (DOE-ID 1997). Each tank is equipped with three subsurface influent lines and one subsurface effluent line. The tanks received radioactive wastewater via an influent line from Tank V-9 (Figure 3). The remaining influent lines include a caustic line used to neutralize the waste prior to transfer to TAN-616 and a return flow line from the TAN-616 pump room. Tank V-3 has an additional inlet line from the TAN-615 east and west sumps. A single effluent line on each tank is routed to the TAN-616 pump room and evaporator system.

Liquid level measurements, recorded since April 1996, track the fluid levels in V-1, V-2, and V-3 (EDF-3067). Measurements since 1996, and anecdotal information preceding 1996, indicate an increase in the liquid level in Tank V-3 during the spring (DOE-ID 2002). All lines, valves, and drains associated with the V-Tanks are either plugged or identified as inactive; therefore, the increase is believed to have been from spring snowmelt and runoff entering the tank through the culvert above the entrance to Tank V-3. Liquid level measurements in Tanks V-1 and V-2 have remained relatively constant, however minor variations due to condensation in the sample lines have been noted (EDF-3067). Since 2001, when the manway seal was replaced on Tank V-3, the level fluctuations have stopped.

The results of the 1996 RI/FS sampling (DOE-ID 1997) were used to estimate the volume of liquid and sludge in the V-Tanks. Table 3 summarizes the four V-Tank's capacities and current contents, and reflects the liquid level increases since the RI/FS publication (INEEL 2003b).

Table 3. V-Tank capacities and current contents.

Tank	Capacity (gal)	Liquid Volume (gal)	Sludge Volume (gal)	Total Waste Volume (gal)
V-1	10,000	1,164	520	1,684
V-2	10,000	1,138	458	1,596
V-3	10,000	7,660	652	8,312
V-9	400	70	250	320
<i>Total</i>	<i>30,400</i>	<i>10,032</i>	<i>1,880</i>	<i>11,912</i>

Based on the 1993 Track 2 investigation (INEL 1994) and the 1996 RI/FS sampling results (DOE-ID 1997), the potential COCs for the three tanks were metals (e.g., mercury, and cadmium), volatile organic compounds (VOCs) (e.g., tetrachloroethene and trichloroethylene), semivolatile organic compounds (SVOCs) (e.g., polychlorinated biphenyls [PCBs]) and radionuclides [e.g., Cs-137, Co-60, Sr-90, and various isotopes of plutonium and uranium]. The 1996 RI/FS sample results indicate potentially problematic levels of fissile materials in the tanks. In 1998, an evaluation of criticality issues associated with TSF-09 determined that there is not sufficient radionuclide mass in each of the V-1, V-2, and V-3 tanks to sustain a critical reaction (Blackmore 1998). Following additional Tank V-9 sampling, the criticality issues were analyzed again in 2003 with no criticality concern being identified as documented in EDF-3477, "Criticality Concerns Associated with the TAN V-Tanks" and EDF-5347, "Criticality Safety Evaluation for the Treatment of the TAN V-Tanks."

TSF-09 is administratively controlled. The site is fenced and posted with signs that identify it as a CERCLA site. No activities can be performed at the site without contacting the Clean/Close TAN directorate, and entry into the site requires radiological control precautions. The purpose of these controls

is to keep worker exposures as low as reasonably achievable (ALARA) and to prevent the spread of contaminated soil (DOE-ID 1997).

1.2.1.2 Tank V-9 (TSF-18). Tank V-9 was installed in 1953 as part of the TAN radioactive waste collection system. This abandoned underground storage tank is located in the open area between the TAN-616 and TAN-633 buildings, and is adjacent to the southeast corner of TSF-09. The 1,514-L (400-gal) stainless steel sump tank is approximately 1.06 m (42 in.) in diameter and extends approximately 2.1 m (7 ft) to the tip of its cone. The top of V -9 is approximately 2.1 m (7 ft) below ground surface (bgs) and is accessible by a 15.2-cm (6-in.) diameter riser that extends to ground surface. A baffle is located in the tank near the inlet ports. Tank V-9 has two subsurface inlet lines that received wastewater from several TAN sources via the TAN-1704 Valve Pit. One subsurface outlet line discharged overflow from Tank V-9 to Tanks V-1, V-2, and V-3 (see Figure 3).

TSF-18 includes the conical-shaped sump tank (Tank V-9), tank contents, an aboveground sand filter that was removed in 2003 (ICP 2004e), ancillary piping in the immediate vicinity of the tank, and surrounding contaminated soil.

The RI/FS (DOE-ID 1997) estimated that approximately 750 to 950 L (200 to 250 gal) of sludge and 265 L (70 gal) of liquid remain in the conical tank. The total volume of waste in the tank is estimated at 1,216 L (320 gal) (Blackmore 1998).

Results of the sampling and analysis of Tank V-9 conducted during the 1996 RI/FS (DOE-ID 1997) indicate the contents of V-9 are of similar chemical nature to those of Tanks V-1, V-2, and V-3. The sample results reported high concentrations of trichloroethylene, Cs-137, and Sr-90. In addition, fissile material was detected; therefore, in 1998, a criticality evaluation was conducted. The evaluation recommended that additional sampling be conducted to adequately assess criticality issues (Blackmore 1998). Eight additional samples were collected from Tank V-9 in April 2001; three of those samples were collected from behind the baffle. The ensuing criticality EDF identified no criticality concerns (EDF-3477, and EDF-5347).

The sand filter located adjacent to the south side of the V-1 tank metal riser culvert was a component of TSF-18. The sand filter was apparently used to remove particulates from the Tank V-9 effluent. The filter was an aboveground concrete box containing material that resembled potting soil in color and texture. The anecdotal history of the structure indicates that it was used for only one day in 1970 before it became plugged.

In accordance with the RD/RAWP Addendum, the sand filter was removed in 2003 and relocated to the TAN CERCLA waste storage area (DOE-ID 2003b). Current plans include transport and disposal at the INEEL CERCLA Disposal Facility (ICDF) in 2004.

TSF-18 is administratively controlled. The site is included in the posted fenced area surrounding TSF-09. No activities can be performed at the site without contacting the Clean/Close TAN Project Manager and entry into the sites requires radiological control precautions.

1.2.1.3 Contaminated Soil. The AOC for the Group 2 sites is defined by the contaminated soil associated with TSF-09 and TSF-18 operations (DOE-ID 1999). The surface and subsurface contaminated soil resulted from spills that occurred during waste transfer. Additional contamination may have originated from runoff from the adjacent cask loading area associated with the TAN-607 storage pool.

A specific pumping event in 1982 accidentally released approximately 6,435 L (1,700 gal) of tank liquids onto the ground surface. The liquid accumulated in a depression along the west side of the tanks

and flowed north out of the controlled radiological area through a shallow ditch. Cleanup operations removed approximately 3.8 m³ (128 ft³) of radioactive soil in a 0.9-m² (10-ft²) area north of the tanks and outside the posted radiological control zone. The excavation was then backfilled with clean soil (INEL 1994).

Since 1983, seven soil sampling events have been conducted at TSF-09, TSF-18, and TSF-21. Appendix H of the initial RD/RAWP (DOE-ID 2002) and the Calendar Year 2003 Summary Report (ICP 2004e) present tabulated analytical results and maps of sample locations. During 1980 and 1983, soil samples collected as part of a decontamination and decommissioning project confirmed that high concentrations of radionuclides were present in the shallow soils surrounding the V-Tanks (INEL 1994). In July 1988, the DOE conducted an environmental survey of the INEEL. The survey collected soil at TSF-09 from three boreholes advanced to a depth of 0.3 to 0.6 m (1 to 2 ft). Samples were analyzed for volatile organic compound (VOCs), semivolatile organic compounds (SVOCs), metals, and beta/gamma activity. Analytical results for the VOC and SVOC analyses were non-detect. Total metals analysis reported slightly elevated levels of mercury and beryllium (INEL 1994).

During the 1993 Track 2 investigation for TSF-09 and TSF-18, three boreholes were advanced to depths from 2.5 to 7.3 m (8 to 24 ft). Samples were analyzed for radionuclides and organic and inorganic constituents. Based on results of the investigation, the soil is contaminated with radionuclides (e.g., elevated levels of beta activity, Cs-137, Co-60, and Sr-90) and low concentrations of organic constituents (e.g., trichloroethylene and PCBs) (INEL 1994). Additional sampling was conducted in 1998 to provide specific data to support waste classification of the soil. Twelve samples were collected from four boreholes. Three boreholes were drilled to a depth of 3 m (10 ft), and the fourth location was advanced to a depth of 6 m (20 ft). Soil samples were analyzed for PCBs, VOCs, and toxicity characteristic leaching procedure (TCLP) metals (DOE-ID 1998). Analytical results were generally non-detect and were below the RCRA-regulated TCLP and land disposal restriction (LDR) concentrations (Hain 1998).

In 2003, an in situ gamma scan survey and additional surface and subsurface samples were collected in the TSF-09/18 area (ICP 2004e). The purpose of this sampling event was to use Cs-137 survey maps to define the extent of contamination for subsequent soil removed that is presented in this work plan. Scanning was completed for 190 points over the entire area. Data from the scanning survey were used to bias subsurface sampling (drilling) locations to verify and better define the TSF-09/18 and TSF-21 CERCLA AOC. The data also confirmed historical information in areas where radioactive surface contamination had occurred. Sampling, completed to further define the AOC, consisted of: (1) drilling in specific locations within the TSF-09/18 and TSF-21 sites and surrounding areas, (2) obtaining the vertical radiological profile of the area through downhole logging at those locations, and (3) collecting soil samples at specific locations.

The results of the 2003 surface scan confirmed the presence of Cs-137 in concentrations greater than 23.3 pCi/g above the V-Tanks. The survey and sampling also showed lower, but nevertheless elevated levels, of Cs-137 near the northeast corner of the former location of building TAN-615. As explained in the summary report, these Cs-137 levels are assumed to not be due to soil contamination, but rather due to radioactive “shine” emitted from a radiological storage area located in the area where TAN-615 once stood. Subsurface investigations at two deep boreholes adjacent to TAN-615 showed a clear trend of decreasing Cs-137 concentration with increasing depth.

Analytical soil data were obtained from four soil cores taken from two locations within the AOC, one location at TSF-21 and one location southwest of Tank V-9. Using these data along with all other data (ICP 2004e), a risk assessment screen was used to analyze the risk acceptability of constituents other

than Cs-137. The conclusion was that only Cs-137 was at issue with the contamination resulting from the V-Tank contents.

1.2.1.4 Miscellaneous Waste Addition. In addition to addressing the V-Tanks and their contained waste, with Agency approval, this remedy includes consolidation and treatment of several miscellaneous waste items that are similar to the V-Tank waste. Those miscellaneous waste items are:

- Returned samples from previous V-Tank sampling events
- Sludge from the OU 1-07B remediation
- Liquid that was in lines between Tank V-9 and Tanks V-1, V-2, and V-3
- ARA-16 sludge and water.

Additional description of these waste items is found in Section 4.3.13.

1.3 Remedial Action Approach Overview

The Agencies have selected the remedy for the V-Tanks site based on CERCLA requirements, the detailed analysis of alternatives, and public comments provided on earlier documents ([DOE-ID 2004b](#)). The remedy selected in the ROD Amendment is soil and tank removal, chemical oxidation/reduction with stabilization of the tank contents, and disposal. The treatment approach identified in Revision 0 of this RD/RAWP Addendum 2 included air sparging and chemical oxidation. However, during design of the air sparging further analysis revealed that air sparging alone at ambient or slightly elevated temperatures (up to and including boiling temperatures) has the potential to achieve the required waste treatment standards without the need for chemical oxidation. This section describes the general approach that will be implemented for remedial action of the V-Tanks. Section 6 contains details of the remedial action implementation. As indicated below, elevated temperature sparging (up to and including boiling temperatures) or chemical oxidation, if required, will be addressed in Addendum 3 (DOE/NE-ID 2004a).

The major components of the selected remedy for the V-Tanks include:

- Removal of tank contents and transfer to consolidation tanks located in the all-weather enclosure to be located north and west of the former location of TAN-616.
- Transfer of miscellaneous waste to the consolidation tanks for subsequent treatment.
- Excavation and removal of the tanks, piping, and ancillary equipment.
- Excavation of contaminated soil as necessary for tank removal.
- Characterization of the removed tanks, pipes, and ancillary equipment and disposal at the ICDF.
- Soil confirmation sampling will be performed to confirm soil above the designated final remediation goal (FRG) for Cs-137 has been removed.
- Soil sampling at the base of the tank excavations to confirm RAOs are met.
- Backfilling the excavated areas with clean pit-run material, contouring and grading the area to provide appropriate site drainage.

- Phase 1 treatment of liquid and sludge by air sparging at elevated temperatures to reduce VOC concentrations.
- Post sparge sampling to confirm that the waste is not RCRA characteristic and meets LDR treatment standards.
- Stabilization of treated waste and disposal at the ICDF if Phase 1 treatment is successful.^a
- If necessary, Phase 2 treatment of liquid and sludge via elevated temperature sparging or chemical oxidation and stabilization on-Site with disposal at the ICDF.^b
- Disposal of waste treatment equipment at the ICDF.
- Soil sampling of soil staging area and areas downwind and tank laydown area.

At the completion of the remedial action, revised institutional controls consisting of signs, access control, and land use restrictions may be established and maintained, depending on results of the soil confirmatory sampling.

2. DESIGN BASIS AND REQUIREMENTS

This section identifies the overall RAOs including FRGs and site HWMA/RCRA closure requirements. This section also identifies the design basis and requirements that must be incorporated into the remedial design and that must also be met in implementing the remedial action.

2.1 Remedial Action Objectives

The RAOs for the TAN V-Tanks were developed in accordance with the *National Oil and Hazardous Substances Pollution Contingency Plan* (EPA 1992) and CERCLA RI/FS guidance (EPA 1988), and defined through discussions with the Agencies. The RAOs are based on results of the human health risk assessment and are specific to the COCs and exposure pathways developed for OU 1-10. The ROD Amendment (DOE-ID 2004b) established RAOs for the V-Tanks, which are identified below for both the soil and the tank contents.

The RAO for the TSF-09/18 soil is:

- Reduce risk from all pathways and all COCs to a total excess cancer risk of less than 1 in 10,000 and a total hazard index of less than 1 for the hypothetical resident 100 years in the future and for the current and future worker.

The RAO for the V-Tank contents is:

- Prevent release to the environment of the V-Tank contents.

a. If air sparging is successful, this work will be addressed in Revision 2 to this RD/RAWP Addendum 2.

b. This work will be addressed in Addendum 3 to the RD/RAWP (DOE/NE-ID 2004a) if air sparging at ambient temperatures does not achieve the required waste treatment standards.

To meet the RAO for soil, a final remediation goal is identified in the ROD Amendment. To meet the RAOs for soil and tank contents, this RD/RAWP Addendum 2 addresses tank and waste inventory removal, contaminated soil removal and disposal, and site backfill and restoration.

The ROD also requires that the tanks and associated piping be HWMA/RCRA closed. Specific HWMA/RCRA closure standards are provided in the HWMA/RCRA Closure Plan ([DOE-ID 2004a](#)) and associated FSP ([DOE-ID 2004c](#)), but are supported by the design and remedial action activities in this document.

The design and remedial action described in the subsequent sections of this document will provide for meeting the RAOs and final remediation goals identified above. The interface between the HWMA/RCRA closure activities and the CERCLA remedial action activities are noted throughout this document.

2.1.1 Final Remediation Goals

To meet the RAO for soil, final remediation goals for the COCs were established and documented in the original ROD to ensure protectiveness of human health and the environment by providing unrestricted land use in 100 years. These goals, which are both contaminant- and site-specific, are quantitative cleanup levels based on ARARs and risk-based doses. The soil FRG for TSF-09/18, as identified in the original ROD, is 23.3 pCi/g for Cs-137.

The Explanation of Significant Differences (ESD) section of the February 2004 ROD Amendment (DOE-ID 2004b) provided clarification on how the FRG applies to the soil remediation based on depth below ground surface (bgs).

- From ground surface to 10 ft bgs, soil exceeding the Cs-137 FRG of 23.3 pCi/g will be excavated and disposed of
- From 10 ft bgs and deeper, soil will only be removed as necessary to support tank and piping removal with concurrence by the Agencies.

In addition the ROD Amendment revised the RAO statement for soil to consider other COCs that may be identified in the soil beneath the tanks and piping.

2.1.2 HWMA/RCRA Closure

The OU 1-10 ROD (DOE-ID 1999) also specifies that the V-Tanks are subject to closure under the State of Idaho Hazardous Waste Management Act (HWMA) (Idaho Statute 1983). To address this requirement, a separate HWMA/RCRA Closure Plan was prepared (DOE-ID 2004a). That closure plan requires the following activities:

- Isolate system components
- Remove waste inventory
- Remove system components
- Sample soils beneath the collecting and sump tanks following removal of these components (e.g., surface soils within the excavation footprint) and analyze for HWMA/RCRA COCs to

confirm CERCLA-derived FRGs are protective with respect to HWMA/RCRA-regulated constituents

- Treatment and disposal of V-Tank contents
- Removal of east sub-foundation wall beneath TAN-616 pump room
- Disposal of caustic tank V-4.

2.2 Record of Decision Remedy Implementation Approach and Performance Criteria

This section describes the implementation approach for the remedy elements specified in the OU 1-10 ROD (DOE-ID 1999), ROD Amendment ([DOE-ID 2004b](#)), and ESD ([DOE/NE-ID 2004c](#)). Table 4 lists the remedy components specified in the ROD, ROD Amendment, and ESD, and the activities that will be conducted to achieve the corresponding remedy element.

2.3 General Requirements

The following sections summarize the general project requirements, the regulatory requirements, and the design criteria that are applicable to the V-Tank site remediation.

2.3.1 Regulatory Requirements

Under CERCLA Section 121 and the National Oil and Hazardous Substances Pollution Contingency Plan (55 FR 46), the Agencies must select remedies that are protective of human health and the environment, that comply with all ARARs, that are cost effective, and that utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ, as a principal element, treatment that permanently and significantly reduces the toxicity, mobility, or volume of hazardous wastes, and has a bias against off-site disposal of untreated wastes. Implementation of the ROD-selected remedies for the V-Tanks will comply with all ARARs for the V-Tanks site. Tables A-1 and A-2 in Appendix A lists the ARARs and includes strategies for ensuring that the ARARs are met.

Table 4. Remedy implementation approach and performance criteria.

Remedy Component ⁱ	Implementation Approach	Performance Criteria
(1) Previous sampling efforts have determined that the V-Tanks contents are not RCRA characteristic. Confirmation sampling of the consolidated V-Tanks waste will be conducted after treatment has removed interferences necessary to confirm that the waste is not characteristically hazardous.	<ul style="list-style-type: none"> Post sparging sampling of the consolidated V-Tanks waste to confirm that the waste is not characteristically hazardous. High-resolution analytical techniques will be used, as necessary. If analytical results are inconclusive, waste samples will be subjected to sparging at elevated temperatures (held at boiling temperatures) and/or chemically oxidized to further remove interfering contaminants in order to confirm the characterization. 	If the treated waste is not RCRA-characteristic, the treated waste must meet the LDR treatment standards for F001 and F005 waste. If the treated waste is RCRA characteristic, then the treatment standards for all underlying hazardous constituents that are reasonably expected to be present must be met.
<p>(2) Consolidating and/or blending of the tank contents to the extent practical to facilitate management of the waste as one homogenous waste stream.</p> <p>If laboratory studies on sludge treatment demonstrate a clear benefit, some of the liquid excess from the treatment process may be decanted and treated separately from the remainder of the waste.</p>	<ul style="list-style-type: none"> The contents of the V-Tanks will be removed and blended in consolidation tanks Separate treatment of the supernatant is not planned. 	Quantitative performance criteria are not appropriate for this component. The performance criterion is the completion of this activity.
(3) Continued temporary use of Tank V-9 for storage until the contents of that tank are removed for transfer to another V-Tank. Continued temporary use of Tanks V-1, V-2, and V-3 without secondary containment for storage of waste prior to treatment, blending waste prior to treatment, and/or providing an accumulation location for treated waste prior to stabilization.	<ul style="list-style-type: none"> No permanent or temporary modifications to the V-Tanks will be made to provide secondary containment. The tanks will continue to contain their current contents until tank contents are removed and tanks are empty. 	Quantitative performance criteria are not appropriate for this component. The performance criterion is the completion of this activity.

Table 4. (continued).

Remedy Component ⁱ	Implementation Approach	Performance Criteria
(4) Air sparging at ambient or elevated temperatures (up to and including boiling temperatures) of V-Tanks contents, chemical oxidation/reduction as necessary, and solidification/stabilization to meet RCRA LDR treatment standards as well as ICDF or other approved disposal facility WAC.	<ul style="list-style-type: none"> The V-Tank contents transferred to the Consolidation Tanks will be treated via air sparging at ambient or slightly elevated temperatures (up to and including boiling temperatures). If this air sparging does not reduce VOC concentrations to less than F001 and F005 treatment standards, the waste will be chemically oxidized. If sparging at elevated temperatures or chemical oxidation is necessary, Addendum 3 to the RD/RAWP^b will address implementation of the sparging at elevated temperatures (up to and including boiling temperatures) or chemical oxidation process to treat the V-Tank contents to meet LDRs and ICDF waste acceptance criteria. 	Treatment, via air sparging at ambient or slightly elevated temperatures (up to and including boiling temperatures) or chemical oxidation, must meet LDR treatment standards for F001 and F005 waste.
(a) A PCB risk-based evaluation under 40 CFR 761.61(c) demonstrates that the PCB concentration in the V-Tanks (average concentration < 18 mg/kg, regulated at 294 mg/kg), does not require treatment in order to demonstrate no unreasonable risk of injury to health and the environment when disposed at the CERCLA approved (RCRA and TSCA ⁱ equivalent) INEEL CERCLA Disposal Facility. ^d	<ul style="list-style-type: none"> No treatment other than solidification is necessary to meet the TSCA treatment standards. 	Treated waste must pass paint filter test after solidification to meet the requirements of the risk-based petition.
(b) Chemical oxidation or reduction will be required for specific UHCs (e.g., BEHP) if the waste is confirmed to exhibit a RCRA ^a characteristic.	NOTE: This element, if necessary, will be addressed in RD/RAWP Addendum 3. ^b	NOTE: Performance criteria will be identified in RD/RAWP Addendum 3. ^b

Table 4. (continued).

Remedy Component ⁱ	Implementation Approach	Performance Criteria
(c) Laboratory studies will be conducted to optimize the choice of specific oxidant(s) or reductant(s) (e.g., peroxide) and to optimize the treatment process.	<ul style="list-style-type: none"> • Previous studies have demonstrated successful use of hydrogen peroxide to oxidize and/or remove the organic contaminants.^c • Additional engineering analysis indicates that air sparging at ambient or slightly elevated temperatures (up to and including boiling temperatures) without chemical oxidation will substantially reduce the VOC concentrations. 	Quantitative performance criteria are not appropriate for this component. The performance criterion is the completion of this activity.
(d) The treatment process selected may be multistage and will be conducted ex situ at the V-Tanks site or in adjacent areas (e.g., TAN-607), as necessary to facilitate remediation.	<ul style="list-style-type: none"> • The treatment process will be performed as follows: <ul style="list-style-type: none"> - Phase 1: Air sparging to reduce the VOC concentration in the V-Tank Waste. - Phase 2: Air sparging at elevated temperatures (up to and including boiling temperatures) or chemical oxidation will be performed, if necessary, to treat the V-Tank waste to the LDR treatment standard. • Treatment will be performed adjacent to the V-Tanks site. <p>NOTE: If required, air sparging at elevated temperature or chemical oxidation will be addressed in RD/RAWP Addendum 3.^b</p>	Quantitative performance criteria are not appropriate for this component. The performance criterion is the completion of this activity.
(5) Performing additional treatment (e.g., solidification, stabilization) of the V-Tanks contents as necessary to meet ICDF or other approved disposal facility WAC.	<ul style="list-style-type: none"> • Following treatment, the waste will be solidified or stabilized to meet ICDF WAC^c Revision 2 to this RD/RAWP Addendum or the RD/RAWP Addendum 3^b will address the details for implementation of this process. 	<ul style="list-style-type: none"> • Note: Performance criteria will be identified in RD/RAWP Addendum 3 or Revision 2 to Addendum 2.
(6) Disposing of the treated tank contents at the ICDF or other approved facility.	<ul style="list-style-type: none"> • Treated tank contents will be packaged and transported to ICDF for disposal. 	The treated tank contents must meet the aforementioned ICDF WAC ^c , which includes the LDRs.

Table 4. (continued).

Remedy Component ⁱ	Implementation Approach	Performance Criteria
(7) Removing and disposing of the V-Tanks and associated piping at the ICDF or other approved facility.	The empty V-tanks will be removed and disposed at ICDF. For disposal at ICDF, the tanks will be filled with grout to eliminate void space. The piping will be removed and disposed at ICDF.	<ul style="list-style-type: none"> The tanks and associated piping must meet ICDF WAC^e and LDRs. See Section 6.5.3 for additional discussion.
(8) Shipping treatment system off-gas residues and other secondary wastes to the ICDF or an approved treatment facility as necessary based on characterization of the wastes.	<ul style="list-style-type: none"> Secondary waste will be characterized for ICDF WAC^e compliance and transportation needs. Material not meeting the ICDF WAC will be shipped off-INEEL and treated, if necessary, for compliant disposal. 	The performance criteria for this remedy component are the ICDF WAC ^e or the WAC for an approved off-INEEL disposal facility. After V-Tank waste treatment, the GAC adsorption units may not meet LDR requirements and therefore may require treatment.
(9) Excavating contaminated soil:	Soil will be excavated as required in these elements. Soil excavation will be conducted in three phases: <ol style="list-style-type: none"> To expose the tanks for installation of sludge removal equipment, approximately 10 ft bgs. Further excavation as needed to remove the tanks, approximately 18 ft bgs. Excavation of contaminated soil in the V-Tank area that exceeds the FRGs, from 0 to 10 ft bgs. 	
<ul style="list-style-type: none"> Excavating contaminated soil that exceeds the FRG to a maximum of 3 m (10 ft) below ground surface (bgs) Excavating additional soil below 3 m (10 ft) bgs to the extent necessary to remove the V-Tanks and associated piping. 	<ul style="list-style-type: none"> Soil from 0–10 ft bgs that exceeds the FRG of 23.3 pCi/g will be excavated Soil that is more than 10 ft bgs will be removed as necessary to support V-Tanks and associated piping removal. Other COCs may be included as FRGs to be protective of human health and the environment in the event the tanks and piping are found to have leaked. 	<ul style="list-style-type: none"> Confirmation sampling confirms soil greater than the FRG of 23.3 pCi/g has been removed. (See item 11 below.) Soil excavation is completed to the extent required for V-Tanks and associated piping removal based on concurrence by the Agencies.
(10) Disposing of the contaminated soil at an approved soil repository.	<ul style="list-style-type: none"> Contaminated soil will be disposed of at ICDF. 	<ul style="list-style-type: none"> Implemented as stated. No quantitative performance criteria are appropriate for this element.

Table 4. (continued).

Remedy Component ⁱ	Implementation Approach	Performance Criteria
(11) Performing post-remediation soil sampling to verify FRGs are met to determine the need for institutional controls, and to analyze for additional contaminants if excavation indicates a release of the V-Tanks contents. Clarified as follows:	<ul style="list-style-type: none"> After excavation, soil confirmation sampling will be performed as follows: 	<ul style="list-style-type: none"> Sampling is completed as stated and is used to meet the following criteria:
(a) For contaminated soil less than 3m (10 ft) bgs, perform post-remediation sampling to verify FRGs are met.	<ul style="list-style-type: none"> For soil less than 3m (10ft) bgs, confirmation sampling will be performed at the bottom of the excavation. 	<ul style="list-style-type: none"> Analytical results confirm soil is less than 23.3 pCi/g for Cs-137.
(b) For contaminated soil more than 3 m (10 ft) bgs, perform post-remediation sampling to determine the need for institutional controls.	<ul style="list-style-type: none"> For soil more than 10 ft bgs, that is not beneath the V-Tanks or piping, sampling will be performed within the excavation to determine the need and time period for Institutional Controls. 	<ul style="list-style-type: none"> Analytical results identify the soil concentration for Cs-137 to determine the need and time period for institutional controls.
(c) For contaminated soil beneath the V-Tanks and piping where there is evidence of a release (either a leak from a V-Tank or the associated piping), perform post-remediation soil sampling at the bottom of the excavation to analyze for V-Tank contaminants to support a risk analysis that supports a potential revision to the FRGs and a determination of the need for further actions. This determination could lead to application of institutional controls, further remediation, or no action.	<p>If there is evidence of a release:</p> <ul style="list-style-type: none"> For a release under piping, biased sampling will be performed on the area of release per the HWMA/RCRA closure plan and associated FSP,^g the contaminated soil will be removed, additional samples collected as appropriate, and a risk analysis will be performed to determine if further remediation is required. For a release observed under the tanks, the soil under the tanks will be sampled per the HWMA/RCRA Closure Plan and associated FSP,^g and a risk analysis will be performed to determine if a new FRG is required. In either case, a determination will be made on what further action (remediation), if any, is required. 	<ul style="list-style-type: none"> Sampling is completed per the HWMA/RCRA Closure Plan^f and its associated FSP.^g A risk analysis is performed to determine if further remediation is required. A determination is made on what further action (remediation, institutional controls, and/or no action), if any, is required. Sampling is completed per the HWMA/RCRA Closure Plan^f and its associated FSP^g. The targeted constituents are discussed in the Field Sampling Plan (ICP 2004a) associated with this Addendum. A determination is made on what further action (remediation), if any, is required.

Table 4. (continued).

Remedy Component ⁱ	Implementation Approach	Performance Criteria
(d) For contaminated soil beneath the V-Tanks and piping where there is no evidence of a release from either the V-Tanks or the associated piping, perform post-remediation soil sampling to determine the appropriate institutional controls, if any, for this site.	<ul style="list-style-type: none"> For soil less than 3m (10ft) bgs, confirmation sampling will be performed at the bottom of the excavation. For soil more than 10 ft bgs, sampling will be performed within the excavation to determine the need and time period for Institutional Controls. 	<ul style="list-style-type: none"> For soils less than 3m (10ft) bgs, sampling results confirm soil is less than 23.3 pCi/g for Cs-137. For soils more than 10 ft bgs, sampling results identify the soil concentration for Cs-137 to determine the need and time period for institutional controls.
(12) Filling the excavated area with clean soil and then contouring and grading to the surrounding elevation.	<ul style="list-style-type: none"> The excavated area will be backfilled with clean pit-run material. The site will be finish graded and contoured to match the surrounding surfaces and ensure drainage away from structures. 	<ul style="list-style-type: none"> Site remediation activities are completed as stated.
(13) Establishing and maintaining institutional controls consisting of signs, access controls, and land-use restrictions, depending on the results of post-remediation sampling. Institutional controls will be required if residual contamination precludes unrestricted land use after completion of remedial action.	<ul style="list-style-type: none"> If contamination is left at the site above 2.3 pCi/g, institutional controls will be reestablished. Using the data from the aforementioned soil sampling conducted for the RCRA FSP^g, risk calculations will be conducted to verify that FRGs are met. If the resulting risk to the current or future resident or current worker exceeds the risk threshold of 1 in 10,000 or a hazard index of one, then institutional controls will be implemented or additional soil will be excavated. Institutional and engineering controls could include deed restrictions, signing and posting, and, if necessary, fencing. 	<ul style="list-style-type: none"> Quantitative performance criteria are not appropriate for this component. The performance criterion is the completion of this activity.
(14) Further characterizing the surrounding contaminated soil and further defining the corresponding area of contamination.	<ul style="list-style-type: none"> Additional characterization of the TSF-09/TSF-18 was conducted in 2003. The results are documented in the Calendar Year 2003 Sampling Summary Report.^h The results of that study have been used to establish the dig-maps, which are presented in Attachment 1. Excavated areas showing evidence of release will be sampled and analyzed for V-Tank constituents. 	<ul style="list-style-type: none"> Quantitative performance criteria are not appropriate for this component. The performance criterion is the completion of this activity.

Table 4. (continued).

Remedy Component ⁱ	Implementation Approach	Performance Criteria
(15) Adding ARARs for managing PCB remediation waste	<ul style="list-style-type: none"> ARARs for PCB waste management are included in Appendix A. Most, if not all, equipment coming into contact with PCB waste will be disposed at the ICDF or other approved facility 	<ul style="list-style-type: none"> The performance criteria for this component is compliance with the ICDF WAC^c or the WAC of the disposing facility.
(16) V-Tanks are subject to closure under the State of Idaho HWMA.	<ul style="list-style-type: none"> Incorporate HWMA/RCRA closure requirements into remedial action 	<ul style="list-style-type: none"> Closure activities are complete and certified by a registered professional engineer.
<p>a. 42 USC 6901 et seq., 1976, "Resource Conservation and Recovery Act of 1976 (Solid Waste Disposal Act)," October 21, 1976.</p> <p>b. DOE/NE-ID, 2004a, "Group 2 Remedial Design/Remedial Action Work Plan Addendum 3 for TSF-09/18 V-Tank Contents Treatment for Test Area North, Waste Area Group 1, Operable Unit 1-10 (Draft)," DOE/NE-ID-11165, Rev. 0 Draft, Month pending, 2004. Will only be written if air sparging is not successful in achieving LDR compliance.</p> <p>c. ICP, 2004f, <i>Cold Bench-Scale Final Test Report for Chemical Oxidation/Stabilization of Surrogate V-Tank Waste at WAG 1, OU 1-10</i>, ICP/EXT-03-00019, Rev 0, April 2004.</p> <p>d. 40 CFR 761.61(c), 2003, "PCB Remediation Waste – Risk-Based Disposal Approval," <i>Code of Federal Regulations</i>, Office of the Federal Register, June 2003.</p> <p>e. DOE-ID, 2004d, <i>Waste Acceptance Criteria for ICDF Landfill</i>, DOE/ID-10865, Rev. 7, August 2004.</p> <p>f. DOE-ID, 2004a <i>Hazardous Waste Management Act/Resource Conservation and Recovery Act Closure Plan for the Test Area North/Technical Support Facility Intermediate-Level Radioactive Waste Management System Phase 2: Feed Subsystem (V-Tanks)</i>, DOE/ID-11053, Rev. 3, July 2004.</p> <p>g. INEEL 2003a, <i>Field Sampling Plan for the HWMA/RCRA Closure of the TAN/TSF Intermediate Level Radioactive Waste Feed Subsystem (V-Tanks)</i>, INEEL/EXT-02-01465, Rev. 0 May 2003.</p> <p>h. ICP, 2004e, <i>V-Tanks TSF-09/18 Calendar Year 2003/2004 Early Remedial Action Activities Sampling Summary Report for Waste Area Group 1, Operable Unit 1-10</i>, ICP/EXT-03-00080, Rev. 0, Idaho Completion Project, August 2004.</p> <p>i. Remedy components 1 through 15 were presented in the ROD Amendment (DOE-ID 2004b), Declaration section, page vii. Elements 1 and 4 are further modified per <i>Explanation of Significant Differences for the Record of Decision for the Test Area North Operable Unit 1-10</i>, (DOE/NE-ID 2004c)</p> <p>j. 15 USC 2601 et seq., 1976, "Toxic Substances Control Act," as amended.</p>		
<div> <div> ARAR = applicable or relevant and appropriate requirement BEHP = CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act CFR = Code of Federal Regulations FRG = final remediation goal GAC = granular activated carbon ICDF = INEEL CERCLA Disposal Facility INEEL = Idaho National Engineering and Environmental Laboratory LDR = land disposal restriction PCB = polychlorinated biphenyl </div> <div> PCE = tetrachloroethene RAO = remedial action objective RCRA = Resource Conservation and Recovery Act RD/RA = Remedial Design/Remedial Action RD/RAWP = Remedial Design/Remedial Action Work Plan TAN = Test Area North TCE = trichloroethylene TSF = Technical Support Facility UHC = underlying hazardous constituent VOC = volatile organic compound WAC = waste acceptance criteria </div> </div>		

2.3.2 Department of Energy Orders

The following DOE orders apply to the design and implementation of the V-Tanks remediation:

- DOE Order 231.1A, “Environment, Safety, and Health Reporting”
- DOE Order 414.1B, “Quality Assurance”
- DOE Order 435.1, “Radioactive Waste”
- DOE Order 470.1, “Safeguards and Security Program”
- DOE Order 5400.5, “Radiation Protection of the Public and Environment”
- DOE Order 5480.4, “Environmental Protection, Safety, and Health Standards.”

2.3.3 INEEL Requirements

The following documents provide key INEEL project-specific requirements that apply to the design and implementation of the V-Tanks remediation:

- *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory* (DOE-ID 1991)
- *Remedial Design and Remedial Action Guidance for the Idaho National Engineering Laboratory* (DOE-ID 1994)
- *Final Record of Decision for Test Area North, Operable Unit 1-10* (DOE-ID 1999)
- *Record of Decision Amendment for the V-Tanks (TSF-09 and TSF-18) and Explanation of Significant Differences for PM-2A Tanks (TSF-26) and TSF-06, Area 10, at Test Area North, Operable Unit 1-10* (DOE-ID 2004b)
- *Explanation of Significant Differences for the Record of Decision for the Test Area North Operable Unit 1-10* ([DOE/NE-ID 2004c](#))
- *Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10, and Deactivation, Decontamination, and Decommissioning* ([DOE-ID 2004e](#))
- *Hazardous Waste Management Act/Resource Conservation and Recovery Act Closure Plan for the Test Area North/Technical Support Facility Intermediate-Level Radioactive Waste Management System Phase 2: Feed Subsystem (V-Tanks)* ([DOE-ID 2004a](#))
- *Waste Acceptance Criteria for ICDF Landfill* ([DOE-ID 2004d](#))
- *Idaho National Engineering Environmental Laboratory Waste Acceptance Criteria* ([DOE-ID 2004f](#))
- *Institutional Control Plan for the Test Area North Waste Area Group 1* ([INEEL 2000](#)).

2.3.4 Reference Documents

The following documents are key reference documents for this RD/RAWP Addendum:

- *Operations and Maintenance Plan for Test Area North, Operable Unit 1-10* ([DOE-ID 2001](#))
- *INEEL Sitewide Institutional Controls Plan* ([DOE-ID 2004g](#)).

2.4 Design Criteria

Based on the general project requirements, regulatory requirements and technical and functional requirements (TFR), project specific design criteria have been developed and provide additional basis for the remedial design. The design criteria include selected general TFRs for the V-Tanks remediation as identified in the following subsections. More detailed requirements are provided in TFR-278, “Technical and Functional Requirements for the Remediation of V-Tanks TSF-09 and TSF-18 Operable Unit 1-10” TFR-278).

2.4.1 Functional and Performance Requirements

This section contains requirements that specify the key functional and performance requirements necessary to complete successful consolidation and Phase 1 treatment of V-Tank contents.

2.4.1.1 Site Preparation

- The project must provide a safe and stable location for staging all equipment
- The project must minimize the effects of weather and human action that would cause transport of contamination to uncontrolled areas.

2.4.1.2 Excavation

- The project must safely excavate soils to the extent necessary to remove the contents of the V-Tanks and the V-Tanks themselves.
- In accordance with the ROD, the project must excavate soils contaminated with Cs-137 in concentrations greater than 23.3 pCi/g that are located higher than 10 ft bgs.
- Excavation activities must meet common industrial practices to protect workers and the general public from physical, radiological, chemical, electrical, and other industrial hazards.
- Disposal of soils having an elevated Cs-137 concentration must be done in a manner protective of human health and the environment.

2.4.1.3 Tank, Piping, and Ancillary Equipment Removal

- The project must remove pipes and lines leading to and coming from the V-Tanks
- During piping and line removal, the project must prevent or capture spillage of line contents
- The four V-Tanks must be removed and disposed of in accordance with applicable LDRs
- Tank hoisting must be conducted in accordance with applicable hoisting and rigging standards

- Tank external surfaces must be cleaned or contained (e.g. wrapped) to the level necessary for safe and compliant transport and disposal.

2.4.1.4 *Transfer/Consolidation System*

- The transfer/consolidation system shall be designed to remove the liquid and sludge from the V-Tanks to enable tank disposal as an LDR compliant waste
- The transfer/consolidation system shall be designed to consolidate, blend, and temporarily store the tank contents prior to, and during, subsequent Phase 2 treatment
- The transfer/consolidation system design shall not restrict subsequent treatment of the tank contents
- The transfer/consolidation system shall be designed to accommodate the V-Tank contents as described in the various characterization and planning documents (DOE-ID 1997; DOE-ID 2000a; DOE-ID 2003b)
- The transfer/consolidation system shall be designed to prevent plugging of the waste transfer and storage systems. The transfer/consolidation system shall also be designed to facilitate unplugging
- All transfer/consolidation system equipment shall meet the substantive, physical requirements specified in 40 CFR 264 Subpart J
- The transfer/consolidation system shall include provisions for air sparging at ambient temperature of the waste as the primary treatment process to remove VOCs and to provide corrosion control.

2.4.1.5 *Tank Off-Gas*

- The off-gas from the tank transfer and consolidation system must be controlled to remain compliant with the applicable or relevant and appropriate requirements listed in Table A-1 of Appendix A
- The off-gas system must maintain inward airflow to protect workers from chemical or radiological exposure that exceeds regulatory limits.

2.4.1.6 *Decontamination and Dismantlement of Equipment*

- The design shall facilitate safe, efficient, and compliant decontamination or disposal of all equipment used in the process.

2.4.1.7 *Waste Transportation*

- The design shall include provisions to safely and compliantly transport the V-Tanks, all contaminated soil, treated waste, and secondary waste that is generated during the remediation to an appropriate disposal facility.

2.4.1.8 Backfilling

- The design shall facilitate backfilling of the excavation site with clean pit-run material meeting the AASHTO M145 soil classification Groups A-1, A-2-4 and A-2-5 (AASHTO 2000).^c
- The design shall not preclude subsequent remedial actions that may be performed on adjacent facilities.

2.4.2 Special Requirements

- The design shall apply ALARA principles to personnel exposure to radioactive and hazardous materials, as applicable, to ensure worker safety
- The design and operation shall provide that individual worker radiation exposure is less than 700 mrem/yr
- The system shall be designed to protect workers in accordance with 29 CFR 1910, “Occupational Safety and Health Standards,” and 29 CFR 1926, “Safety and Health Regulations for Construction,” or the INEEL equivalent
- The design shall ensure that emergency response equipment is provided as necessary and required by 40 CFR 264 Subpart C, “Preparedness and Prevention,” and Subpart D, “Contingency Plan and Emergency Procedures.”

2.4.3 Engineering Design Requirements

- Structural components shall be designed to meet industry standards. Analysis shall be based on the rated weight capacity of the equipment
- Electrical systems shall be in compliance with the National Electrical Code
- The design shall ensure that control sensors—determined to be critical to successful operation—are redundant
- The design shall ensure that the operating systems are designed to be fail-safe, (e.g., in the situation where power is cut to the treatment system, the processing must safely shut down until power can be restored)
- The system shall be designed in a manner that supports prevention of fires and explosion during construction, operation, and maintenance.

2.4.4 Testing and Maintenance Requirements

- The project design shall consider features (e.g., attributes and components) that facilitate leak and pressure testing
- The project design shall consider features in the emissions monitoring system that facilitate testing for operability

c. This type of material allows for relative ease of compaction and, when properly compacted, provides structural stability.

- All lifting devices shall be designed and load-tested in accordance with DOE-STD-1090-2004, Hoisting and Rigging Standard, Chapter 14, “Below the Hook Lifting Devices.”

2.4.5 Other General Requirements

- The design shall ensure that all material selections for equipment and components are made based on a 5-year life of the equipment
- The project shall ensure that any welding planned to be performed onsite be performed in accordance with the *INEEL Welding Manual* (INEEL 2004a)
- The project shall ensure that any welding to be performed off-site will be done in accordance with recognized consensus standards
- The project shall ensure that any welding planned for nonmetallic components be performed according to consensus standards or manufacturer’s specifications.

2.5 Key Codes and Standards

The system and facility modifications required to implement this design shall comply with common industrial codes and standards, regulations, and appropriate INEEL practices. This section lists the key codes, standards, regulations, and INEEL documents that are applicable to this project. Additional codes and standards will be listed in TFR-278 as they are identified.

ANSI 6.4.2-1985, “Specification for Radiation Shielding Materials”

ANSI C2-2002, “National Electrical Safety Code”

ASME AG-1, “Code on Nuclear Air and Gas Treatment”

ASME Boiler and Pressure Vessel Code Section VIII

ASME B16, “Fittings, Flanges, and Valves”

ASME B31.3, “Process Piping,” (2002 Edition, Fluid Category “M”)

NFPA 70, “National Electric Code”

NFPA 101, “Life Safety Code”

DOE-STD-3020-97, “Specification for HEPA Filters used by DOE Contractors.”

3. UNCERTAINTY MANAGEMENT

During the remedial design, project personnel identified a variety of uncertainties and project risks. To the extent practicable, a qualitative assessment of risk was made. This section discusses the identified risks and specific actions that are being taken to mitigate the risk prior to or during remediation. Table 5 summarizes the uncertainties that were analyzed.

Table 5. Identification and mitigation of remedial action uncertainties.

Uncertainty	Risk	Consequences	Mitigative Action
Meeting established schedule	High	Additional time needed for project completion.	The schedule is an accelerated schedule with no float time, however, expedited procurements, overtime, and parallel task scheduling are being implemented.
Sludge removal failure	Medium	Additional time needed for project completion. Increased cost. Alternate technology needed for sludge removal.	Mock-up testing of new equipment. Additional spray nozzles being developed. Use alternate sludge removal system if initial attempts fail; AEA Sludge removal systems currently located at the Test Reactor Area or Oak Ridge National Laboratories may be available. If mock-up of sludge removal system is ineffective, then one of the AEA systems could be modified and deployed. Macroencapsulation of Tank V-9 may be used.
Piping, flange, or tank leakage	Medium	Contamination exposure. Additional remediation. Additional decontamination. Increased cost.	Double containment where appropriate. Bagging of all flanges. Routine inspection to detect small leaks.
Higher than anticipated radiation dose during operations	Low	Higher worker dose. Reduced stay time. Project delays. Increased cost.	Sludge removal design incorporates appropriate time, distance, and shielding. Radiation fields are predicted prior to starting fieldwork. Radiation fields are reevaluated after Phase 1 excavation. Real-time analysis will be conducted during remediation activities and work controls adjusted as necessary.
Higher than anticipated volume of contaminated soil	Low	Project delays. Increased cost.	None needed.
Additional contaminants might be found that contribute to the FRGs.	Low regulatory risk. Medium/ high programmatic risk.	Project delays. Increased cost	A thorough review of previous data has given confidence that the site is adequately characterized. Excavate more than appears necessary for Cs-137 remediation. Request quick turn around time for laboratory analysis.
Air sparging at ambient temperature may not sufficiently remove the VOCs to enable subsequent disposal in the ICDF	Low regulatory risk Medium/high programmatic risk.	Project delays. Increased cost	If air sparging at ambient temperature is not successful, Phase 2 treatment by high-temperature sparging or chemical oxidation will be conducted.

Table 5. (continued).

Uncertainty	Risk	Consequences	Mitigative Action
The proposed method for confirming the non-characteristic nature of the waste shows the waste to characteristic or is inconclusive.	Low regulatory risk Medium/high programmatic risk	UTS for UHCs must be met thus requiring Phase 2 treatment by chemical oxidation.	Use of high-resolution analytical techniques as necessary.

4. REMEDIAL DESIGN

This section presents the design for V-Tanks remediation. The remedial design includes an overview with identification of analysis performed, design assumptions, and a detailed design description. Design drawings and specifications are identified and included as Attachments 1 and 2, respectively. For some portions of the design, more detailed design drawings and specifications may be prepared to support material and equipment fabrication, procurement, or fieldwork implementation; however, such additional design documents are not included in this RD/RAWP Addendum.

4.1 Design Overview

The design in this RD/RAWP (Addendum 2) focuses on waste consolidation, tank removal, and soil remediation and Phase 1 treatment. The items listed below provide a summary of the design elements. Detailed description of the design is given in Sections 4.3 through 4.6 and the remedial activities are described in Sections 6.2 through 6.5. All the engineering drawings referenced in this document are provided in Attachment 1. Although this RD/RAWP focuses on removal of the tanks and tank contents, and Phase 1 treatment, the design does not prohibit Phase 2 treatment, if such treatment becomes necessary.

- **Tank Excavation and Equipment**—The tanks will be excavated in three phases. Phase 1 excavates down to the top of the tanks so that piping can be removed and the contents removal equipment can be installed. Any residual liquids in the pipes will be returned to the V-Tanks. Phase 2 excavation involves excavating around the V-Tanks and pipes to enable their removal. A mobile crane or other appropriate lifting device will be used to lift the tanks and pipes from the pit. Phase 3 excavation will remove contaminated soils from the tank excavation area, the waste line location and the valve box location (see Drawing C-6), in addition to any contaminated surface soil areas to meet the FRGs.^d A trackhoe and vacuum excavator or similar equipment will be used for all excavation. The removed tanks and pipes will be sent to ICDF for disposal. The pipes will be sized and placed into standard waste boxes. The V-Tanks will be transported to the ICDF where they will be placed in the landfill and filled with grout.
- **Supernatant and Sludge Removal Equipment**—Sludge removal equipment will be installed that will suction out the contents of all the V-Tanks and discharge the contents to consolidation tanks located northwest of the former location of TAN-616 (see Drawing C-1). The sludge removal equipment uses a set of peristaltic pumps and double-diaphragm pumps coupled to a steerable nozzle and a suction hose attached to a long reach rod. The supernatant in Tank V-3 will be removed first and stored separately so that it can be used for tank rinsing later. Operators will then manually engage the pump-set to loosen up the sludge in the bottom of the Tank V-3 followed by sludge removal from Tanks V-1, and V-2, and V-9. The pump-set will loosen, slurry, and mix the sludge prior to suctioning it to a set of waste Consolidation Tanks. Due to the higher density of the sludge in Tank V-9, that tank will be fitted with high pressure spray wands that will loosen and dislodge the sludge and enable its removal via the suction wand. Due to the higher radiation fields associated with Tank V-9, rinsing and sludge removal will be conducted in a semi-remote fashion.
- **Tank Rinsing Equipment**—After sludge is removed from the V-Tanks, they will be rinsed using high-pressure spray. A manually maneuverable wand will deliver a water spray that can reach nearly all areas inside of the V-Tanks. The supernatant removed from Tank V-3 will be the primary

d. For example, 23.3 pCi/g Cs-137 and any other contaminants that may be added as a result of further risk analysis.

rinse water used, however provisions are included to enable the addition of clean water if necessary.

- Phase 1 Treatment (air sparging at ambient temperature) —Upon completion of the waste transfer from the V-Tanks to the Consolidation Tanks, the waste will be treated by air sparging at ambient temperature. The purpose of air sparging is to remove the VOCs to achieve the LDR treatment standards and to control corrosion of the treatment equipment. If air sparging does not achieve the desired results, then Phase 2 treatment by air sparging at elevated temperatures or chemical oxidation would be conducted.^e After treatment by air sparging or chemical oxidation, the waste will be stabilized and disposed in the ICDF.^f
- Site Backfill—After confirmation sampling demonstrates the compliance with FRGs and an evaluation of the need for institutional controls has been completed, the excavated areas will be backfilled with clean pit-run material obtained from the TAN Gravel Pit. Areas near TAN-607 may be disturbed by other activities in the near future, such as decontamination and decommissioning of the Hot Shop; therefore, those areas will not be reseeded.

4.2 Design Assumptions

The following items are limiting factors and bounding conditions under which the remedial design for the V-Tank remediation was developed.

- The V-Tank contents are F001 listed waste and are not RCRA characteristic.
- ARA-16 waste is RCRA F005 listed waste.
- During waste treatment, the GAC adsorption units will become F001 and F005 listed waste that may require treatment prior to LDR-compliant disposal.
- Previous characterization efforts addressed criticality concerns associated with the TAN V-Tanks and were documented by EDF-3477 and EDF-5347, which confirmed that there are no credible mechanisms that could preferentially concentrate fissile material; thus a criticality associated with the V-tanks is not possible. It is therefore assumed that the remedial design and remedial action need not address criticality concerns.
- Historical sample data are representative of the physical, chemical, and radiological properties of the V-Tank and ARA-16 sludge and the contamination to be encountered in all media.
- Tanks are made of 1/4-in.-thick stainless steel.
- Tank configuration, tank location piping, and utilities are as presented in available INEEL engineering drawings.
- Tanks and piping have not leaked.

e. Phase 2 treatment using elevated temperatures or chemical oxidation will be addressed in Addendum 3 (DOE/NE-ID 2004a).

f. Stabilization will be addressed in Revision 2 to this document or in Addendum 3 (DOE/NE-ID 2004a).

- The tank sludge has not hardened; the sludge can be suspended in water by mechanical action or low-intensity shear forces.
- The ICDF WAC (DOE-ID 2004d) will be modified to allow acceptance of the LDR-compliant V-Tanks without sizing and the V-Tanks can be filled with grout at the ICDF.
- The verification of the soil needed for disposal at ICDF is completed and the current waste profile is verified.
- The addition of ARA-16 waste and the other identified miscellaneous waste items will not introduce a nuclear criticality concern. (See EDF-5347)

4.3 Detailed Design Description

This section describes the function and features of the key equipment and process that will be used to remediate the TAN V-Tanks. The equipment, piping, instrumentation, and flow diagrams are presented in Attachment 1.

4.3.1 Equipment Layout

Drawings P-1 and P-2 of Attachment 1 depicts the overall process flow. The overall equipment layout is shown in Drawings C-1 and P-3.

The equipment needed for waste suctioning will be located to the southwest of the V-Tank excavation, as shown in Drawing C-1. All the lines shown for the suctioning equipment will be aboveground and unshielded to permit visual inspection for potential leaks and spills. The video monitors and hand tools will be placed on a platform (see Drawing C-8) or stable surface near the manway of the tank being remediated. The platform and monitor will be moved from tank to tank as needed.

Three tanks will be used to receive the sludge and supernatant from the V-Tanks. These tanks, called the “Consolidation Tanks,” will be located north of TAN-666 as shown in Drawing C-1. This area was chosen because it is least obstructive to other ongoing activities at TAN. Treatment of the consolidated waste will be done during winter weather. Therefore, a heated, all-weather, sprung-fabric enclosure will be erected to house the consolidation tanks and treatment equipment.

Temporary staging areas will be built to accommodate the excavated soil and the four V-Tanks. Additional construction details for this staging area are provided in Section 4.3.2.3 and Drawing C-2.

4.3.2 Excavation and Tank Removal

Excavation and tank and piping removal will be conducted in three phases: (1) remove most of the soil above the tanks to allow for equipment installation; (2) remove soil to enable tank removal; and (3) remove soil in the general V-Tank area that is above the remediation goals. Each phase is described in greater detail below. Drawings C-2 through C-6 depict excavation areas and progression.

Table 6 provides a list of recommended equipment needed for excavation and tank removal.

Table 6. Key equipment needed for excavation and tank removal.

Quantity	Equipment ^a	Description
1	Utilivac vacuum excavator	Vacuum excavator
1	Trackhoe	Trackhoe with an extendable bucket capable of digging to a 20-ft depth
1	10-yd ³ dump truck (or similar equivalent)	
	Grove 120-ton crane	Crane
As needed	Hand digging tools	
As needed	Rigging for tank lifting	
1	Long flatbed truck	For transport of the removed V-Tanks to the ICDF
As needed	Personal protective equipment	
As needed	Miscellaneous tools for cutting and capping pipe	
As needed	Cribbing material	Material to stabilize the tanks when placing the rigging and during storage.
300 ft	Fencing to delineate the work areas	
As needed	Silt fencing material	Silt fencing material to minimize erosion
As needed	Soil bags	Large synthetic soil bags to contain excavated soil

a. References herein to any commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the U.S. Government, any agency thereof, or any company affiliated with the Idaho National Engineering and Environmental Laboratory. Equivalent equipment may be selected.

ICDF = INEEL CERCLA Disposal Facility

4.3.2.1 Excavation Phase 1. In the first excavation phase, soil will be removed to the top of each V-Tank to expose the tank and piping. To ensure that pipes are not inadvertently breached, vacuum excavation, hand digging, and other appropriate measures will be used to remove the soil. The sloping needed for Phase 1 excavation is shown in Drawing C-7. Because the slope is specified as 1.5:1 (horizontal to vertical), shoring for this phase is not anticipated (29 CFR 1926.652[b]). Soil removed during Phase 1 excavation will be transferred to the staging area or placed directly into containers for shipment to the ICDF.

As pipes are removed, the any liquids in the pipes will be collected and returned to the V-Tanks.

4.3.2.2 Excavation Phase 2. The second phase of excavation will occur after the sludge has been removed from the V-Tanks. Heavy equipment, such as a trackhoe with an extendable boom, or a vacuum excavator will be used to remove sufficient additional soil around the V-Tanks to enable their removal. As shown in Section C of Drawing C-7, this depth will be approximately 19 ft below grade. The slope of the Phase 2 excavation will be kept to a maximum of 1.5:1 so that shoring for excavation Phase 2 is not anticipated. Soil removed during Phase 2 excavation will be transferred to the staging area or placed directly into containers for shipment to the ICDF.

4.3.2.3 Soil and Tank Staging Area. The soil removed during the first two excavation phases may be placed in a temporary staging area located approximately 200 ft north of the V-Tank area. If the soil does not meet the radiological control criteria, it may be placed in roll-off containers or large soil bags (approximately 8 × 8 × 4 ft), which will be stored in the soil storage area. The Phase 1 and Phase 2 excavations are expected to be considerably slower than the Phase 3 excavation. A subcontractor is being employed to transport all the soil to the ICDF. Therefore, the soil staging area is a means to more efficiently utilize the transportation and disposal subcontractor. Soil in the staging area will be managed in accordance with the requirements for soil staging piles in the Waste Management Plan (WMP) ([ICP 2004b](#)).

The staging area will be bermed and managed to prevent stormwater movement into or out of the staging area. The staging area will not be lined; instead, an additional 6 in. (nominal) of native soil will be removed when the contaminated soil is removed for transport to the ICDF. Construction details for the staging area are shown in Drawings C-9 and C-10.

4.3.2.4 Tank Removal. To remove Tanks V-1, V-2, and V-3, lifting slings will be placed under the tanks in accordance with standard INEEL hoisting and rigging requirements (DOE-STD-1090-2004; GDE—67). For Tank V-9, a choke sling will be placed under the top flange. Drawings C-14 through C-18 show the preferred tank removal method and how the rigging will be placed for each tank. A Grove 120-ton crane (or equivalent) will be used to pick the tanks out of the excavation and place them onto transport trucks or into a staging area adjacent to the V-Tank excavation.

The current design calls for using a vacuum excavator to burrow holes for the rigging Tanks V-1, V-2, and V-3. However, soil conditions may preclude the use of a vacuum excavator. Therefore, alternate methods to place the rigging may be used. Some examples include, but are not limited to, use of a “Processor” to lift one end of the tank to allow slings to be slid under the tank. Long reach tools and hand excavation may be necessary. Care will be exercised to ensure that the hoisting and rigging requirements are met, that the adjacent building foundations are not undermined, and that personnel are not located in any areas where they could be at risk from the operations. If additional excavation requires deviation from the 1.5:1 sloping requirements, then appropriate shoring will be used.

Another, but less desirable, option would involve the addition of pad-eyes welded to the top of the tanks. If used, this option would require additional engineering analysis to ensure the structural integrity of the welded fittings. Regardless of which option is used, the INEEL hoisting and rigging requirements will be followed. Approval to proceed with alternate lifting options is granted through the normal INEEL work control process.

4.3.2.5 Excavation Phase 3. Once the tanks are removed, additional soil will be excavated to remove soil that exceeds the FRGs. As described in Section 6.2.15, field screening and confirmation sampling will be conducted. The excavated soil will be disposed of at the ICDF. The nominal area and depths of excavation are shown in Drawing C-7. The foundation pilings of Building TAN-633 are near the tank excavation. Therefore, excavation will be minimized (while still achieving the FRGs) so that the excavation and associated sloping requirements do not adversely impact the TAN-633 foundation.

In addition, soil around the previous location of Valve Pit No. 2 and TAN-633 area will be excavated and sloped as shown in Drawings C-5, C-6, and C-7. The purpose of this excavation is to remove soil that contains contamination above the FRG of 23.3 pCi/g Cs-137.

The TAN-616 D&D Project left part of the TAN-616 pump room sub-foundation. The east sub-foundation wall (and possibly the north and south sub-foundation walls) will be removed as part of the Phase 3 excavation. The concrete wall material will be removed and disposed at ICDF.

Soil removed during Phase 3 excavation will be transferred to the staging area or placed directly into soil bags or roll-off containers for shipment to the ICDF.

4.3.2.6 Dust Control. Excavated soil will be placed in roll-off containers or soil bags that are nominally 8 × 8 × 5 ft high or placed into the bulk soil staging area shown in Drawing C-9. If bulk soil staging is used, a high-density polyethylene (HDPE) cover will be placed over the soil and secured with sandbags as needed. In addition, trucks transporting bulk soil will be covered as needed; trucks transporting soil bags will not be covered.

4.3.2.7 Storm Water Control. The perimeter of the soil storage area will be bermed with native soils. The berm will be 1 ft high and approximately 2 ft wide at the base, as shown in Drawing C-4.

Similarly, as shown in Drawing C-4, the perimeter of the V-Tank excavations will also be bermed to prevent storm water intrusion.

Drain lines from the roofs of nearby buildings will be rerouted, as needed, to direct precipitation runoff away from the excavated areas (See Drawing C-4).

4.3.3 Secondary Containment

Secondary containment or daily inspection of the equipment is required in accordance with the RCRA tank regulations (40 CFR 264 Subpart J). Inside the all-weather enclosure, the three Consolidation Tanks and their associated equipment will be placed within a containment pan, shown in Drawing S-1. The containment pan is sized to contain a net volume of 8,050 gal, which is greater than the volume of a single consolidation tank (8,000 gal). The 8,050 gal minimal volume is the net volume, which includes provisions for equipment and structural components co-located in the containment pan.

As shown in Drawings P-1 and P-2, secondary containment will be provided for the piping outside the all-weather enclosure between Pump P-1 and the containment pan.

For piping upstream of Pump P-1, daily visual inspections will be conducted during operations or during times when hazardous material may be present in the pipes to check for leaks.

A notable feature of the secondary containment pan is the radiation shield wall between the Consolidation Tanks and the pump area. The radiation field near the Consolidation Tanks is estimated to be approximately 1 R/hr, a high radiation area. Therefore, the shield wall is necessary to allow operators to temporarily work on the pumps without being unnecessarily exposed. The pump area will not be a routinely manned area.

4.3.4 Supernatant Removal

As shown in Drawings P-1 and P-5, supernatant will be withdrawn from Tank V-3 using a suction pump. The suction pumps VTANK-REM-P-1 and -P-5, which will be located approximately 1 ft above the top of the V-Tanks, will be capable of lifting supernate from the bottom of the V-Tanks to the pump, and then pressure-fed to one of the Consolidation Tanks in the all-weather enclosure. Pumps P-1 and P-5 are identical redundant pumps; they are electric-operated, variable speed, reversible, peristaltic pumps.

To prevent excessive quantities of sludge from being entrained in the supernatant, the suction hose will be attached to a floating suction strainer that will float on the supernatant surface. A video

camera mounted inside the V-Tanks will enable operators to visually monitor the supernatant as it is drawn into the suction hose.

The supernatant will be used in subsequent steps for loosening the sludge in Tank V-9 and for rinsing the tanks after the sludge is removed.

4.3.5 V-9 Sludge Removal

Due to the thicker consistency of the sludge in Tank V-9, removal of this sludge is expected to be more difficult than for the other tanks. Additionally, the baffle in Tank V-9 restricts access to sludge located between the inlet and the baffle. As shown in Drawing P-6, the design includes a video camera to monitor the installation and operation of the sludge removal equipment.

A steel, open-ended pipe will be lowered directly into the center pipe flange on top of Tank V-9. The end of the pipe suction nozzle will be manually pushed to the conical bottom. The operators will retreat to the control panel and suction from Pump P-1 will be turned on to remove material from the tank. As shown in Drawing P-1, capabilities have also been added to use supernatant to backflush the pipe if it becomes plugged.

To help loosen the sludge from the conical bottom and from behind the baffle, the supernatant that originated from Tank V-3 will be pumped into Tank V-9 through a commercial pressure washer. The spray washer can provide heated water and is intended to slurry the sludge allowing removal by pumping.

The spray and suction nozzles are expected to loosen and remove enough sludge from the conical bottom to cause the sludge located behind the baffle to collapse and fall to the conical bottom where it would be suctioned.

If necessary, a hole will be cut in the top of Tank V-9 to allow better access to the inlet side of the baffle.

The sludge in Tank V-9 emits a significantly higher radiation field than the sludge in the other tanks. Therefore, to protect the workers from excessive radiation exposure, a thick carbon steel shield plate will be placed over Tank V-9 for radiation shielding.

4.3.6 V-1, V-2, and V-3 Sludge Removal

The piping and flow diagrams, and equipment installation are shown in Drawings P-1 through P-7. Sludge removal from Tanks V-1, V-2, and V-3 will be accomplished through the use of a double-diaphragm pump (P-6, P-7, or P-8 respectively^g) in combination with the peristaltic pumps (P-1 and P-5). Each tank will be equipped with a double-diaphragm pump that will draw from a V-Tank sump and discharge through a nozzle at the other end of the tank (See Drawing P-6, Step 3). The vigorous flow through the double-diaphragm flow circuit will loosen and mix the sludge. Once the sludge is mixed, the peristaltic pump (P-1 or P-5) will be turned on to draw sludge from the upstream side of the double-diaphragm pump and discharge it to the Consolidation Tanks. Pump P-1 and P-5 provide redundancy to ensure proper sludge transfer in the event of a pump failure.

g. The full designation for these pumps is given on Drawing P-1 as VTANK-REM-P-6, for example.

If additional tank cleaning is necessary, supernatant or clean water can be sprayed to the bottom of the V-Tanks through a spray wand nozzle attached to a manual extension rod (see Detail 4, Drawing P-6). Both the manual extension rod and the spray wand nozzle are steerable so that the flow can be directed to areas containing stubborn sludge.

The suction line for Tanks V-1, V-2, and V-3 draws from the sump of each tank and is housed in an existing 4-in. riser (see Detail 4, Drawing P-7). The suction lines exit each tank through a port that is several feet away from the manway where the operator may be standing. Lead blankets will be placed over the sludge suction lines as needed to provide the necessary radiation shielding.

A video camera located in the top center of the V-Tank will assist the operator in maneuvering the spray nozzles. If the sludge removal becomes troublesome, the design enables the recirculation of sludge, supernatant, or clean water to the spray nozzles for the purpose of loosening the sludge.

The bottom of the suction pipe will sit one inch above the bottom of the tank; this one-inch gap will prevent large particles or debris from plugging the suction system. In the event the accumulation of particulate in the lines creates an obstruction that will impede continued operation, the pumps can be reversed to backflow the line and remove the solids. The reversibility of the peristaltic pumps enables the suction lines to be cleared in the event of a line or suction nozzle plugging.

The inclusion of the double-diaphragm pumps and the redundant peristaltic pump (P-5) are notable additions in Revision 1 to this RD/RAWP Addendum 2. These additions enhance sludge removal and remote operation to reduce worker exposure.

4.3.7 Tank Rinsing

Once the bulk of the sludge and remaining supernatant is removed from a V-Tank, the spray nozzle will be manipulated to rinse the walls and floor of the V-Tank. In addition, a Hotsy^h steam cleaner will be available for spraying and cleaning the interior tank surfaces.

The nozzles used for spray rinsing will be mounted in the manway and will be manually adjustable both vertically and rotationally so that it can direct the spray to all areas inside the tank. The spray will easily reach the far end of the tanks.

4.3.8 Consolidation Tank Assembly

Three Consolidation Tanks will be located in the all-weather enclosure to receive the supernatant and sludge removed from the V-Tanks. One tank will initially store the supernatant while the other two tanks will initially store the sludge; after tank rinsing, the waste will be consolidated into two of the Consolidation Tanks, so that the third tank can be used for subsequent treatment operations. The design for each tank is identical to enhance operational flexibility. Each tank will be an 8,000-gal tank manufactured from stainless steel. Drawing P-10 provides the available construction details; the tank vendor will provide refinement of the Consolidation Tank drawings. The piping and instrument drawing for the Consolidation Tanks is provided in Drawing P-2.ⁱ Each Consolidation Tank is nominally 13.5 ft

h. References herein to any commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the U.S. Government, any agency thereof, or any company affiliated with the Idaho National Engineering and Environmental Laboratory.

i. The Consolidation Tanks are designated as VTAN-REM-T-2, and VTAN-REM-T-3 in drawing P-2.

high and 10 ft in diameter with a dished bottom. This configuration reduces the footprint, enables thorough mixing, and minimizes areas that could entrap sludge and make tank cleaning difficult.

The Consolidation Tanks will be placed in a containment pan that is sized to hold a minimum of 8,050 gal, which is greater than the capacity of a single tank.

Each Consolidation Tank will have a 10-hp recirculation pump that can be used to circulate the contents of the tank. The Consolidation Tanks include a 5-hp impeller that will be used to enhance mixing during consolidation/blending and treatment. This impeller will also be used to preclude solids from settling out during interim storage prior to treatment. In addition, the piping is configured to enable the pumps to transfer the contents back into the V-Tanks via the spray nozzles, or to one of the other Consolidation Tanks. This feature is included to enable the use of relatively clean supernatant as a rinsing solution for the V-Tanks and to enable the mixing of sludge from one Consolidation Tank to another. As shown in Drawing P-2, each Consolidation Tank includes provisions for collecting samples.

To prevent overfilling the Consolidation Tanks, each tank will be fitted with a level-indicating transducer that will alarm and terminate all pump operation, thus terminating flow to the tank. Drawings E-8, and E-11 provide additional engineering details.

Notable revisions to the Consolidation Tank system include provision for transfer of supernatant to and from the scrubber system and connection of the tanks' off-gas to the off-gas system.

After installation of the Consolidation Tanks is complete, a qualified, registered professional engineer will inspect the installation for evidence of weld breaks, punctures, cracks, and other discrepancies in accordance with 40 CFR 264.192(b). All discrepancies will be resolved in an inspection report prior to use of the tank for hazardous waste operations.

4.3.9 Radiation Shield Walls

Due to the high radiation fields caused by the waste, the Consolidation Tanks area must be shielded. Drawing S-8 shows the general shield wall arrangement. The shield walls will be prefabricated concrete structure that will be placed on top of a compacted gravel footing.. Construction details are provided in Drawings S-6 through S-8.

4.3.10 Air Sparging Equipment

The Consolidation Tanks include an air sparge ring in each tank. The purpose of the air sparger is to deliver air that will reduce VOC concentrations from the transferred waste. The goal of the air sparging operation is to reduce the VOC concentrations below LDR standards and to control corrosion of the treatment equipment.

Due to the low volatility of SVOCs and PCBs, air sparging at ambient temperature is not expected to remove significant quantities of SVOCs and PCBs.

As described below, the VOCs released during consolidation activities will be captured in the off-gas system with a sulfur-impregnated granular activated carbon (S-GAC) adsorption units.

A portable air compressor will supply the necessary sparging air. The air will be delivered at nominally 40 scfm to one Consolidation Tank at a time. Sparging will continue for approximately 42 hours; the duration of sparging was calculated through a modeling effort described in EDF-4956.

After completion of the designated sparging time, samples will be collected from a sample port located under one of the cross-mixing Consolidation Tanks. Section 6.2.14 and the Phase 1 treatment Field Sampling Plan ([ICP 2004h](#)) provide additional discussion regarding the sampling protocols.

4.3.11 V-Tank Off-Gas Assemblies

To prevent the spread of contamination and to collect VOCs from the aforementioned air sparging, the V-Tanks and the Consolidation Tanks must be maintained at a negative pressure and the off-gas must be treated to appropriate regulatory levels. Activities that are expected to produce contaminated off-gas are primarily associated with air sparging in the Consolidation Tanks; minor amounts may be generated from equipment installation and V-Tank rinsing.

As shown in Drawing P-2A, the off-gas system includes three HEPA-blower units, two heaters, two S-GAC adsorption units and a wet scrubber. The in-line HEPA filter provides primary protection against the release of radionuclides and the S-GAC adsorption units capture organics in the off-gas stream. In addition, the S-GAC adsorption units includes activated carbon that is impregnated with sulfur. The purpose of the sulfur is to absorb potential mercury in the off-gas that could be released during treatment. The exact chemical form of the mercury in the V-Tank waste is not known; therefore, the design has conservatively assumed that all of the mercury is elemental.

Prior to the waste transfer and tank rinsing operations, the manways will be partially sealed off with a flexible membrane, thus lowering the flow from the V-Tanks. However, bleed air will be fed to the off-gas system to maintain an overall high airflow; this configuration enables the system to maintain an acceptable face velocity across the manway in the event of a membrane failure. Although the addition of bleed air reduces the residence time in the S-GAC adsorption units, the overall emissions during air sparging have been calculated to be acceptable (See Attachment 4).

The equipment installation process will produce a significantly greater off-gas flow than the tank rinsing, air sparging, or chemical oxidation processes. Therefore, during tank rinsing or treatment operations, bleed air will be introduced to help balance the off-gas flow. The bleed air intake includes a HEPA-blower unit to mitigate contamination spread if an upset condition occurs.

- The off-gas system includes the following features:
- Electric heaters to reduce the relative humidity of the off-gas and prevent condensation in the system
- The HEPA filters are of a bag-out design and the S-GAC adsorption units can be easily changed
- The S-GAC adsorption units are impregnated with sulfur for mercury removal
- A wet scrubber to remove particulate that may be entrained during air sparging
- Upstream and downstream sampling points on the HEPA filter to comply with the in place HEPA filter testing requirements of TPR-5054
- Differential pressure gauges on each filter and filter bank to indicate pressure drop.

During air sparging, the flow from the V-Tank will be shut off and the airflow from the sparge operation will be nominally 40 scfm to maintain proper airflow through the wet scrubber. Bleed air will be reduced to establish a total gas flow less than 250 scfm so as to maintain the proper gas residence time

in the S-GAC adsorption units. Additional details regarding the component sizing and airflow balances for the off-gas system can be found in EDF-4956, found in Attachment 3.

The S-GAC adsorption units are calculated to not require change-out during the tank rinsing and air sparging operations. Disposal of the S-GAC adsorption units is discussed in the WMP ([ICP 2004b](#)).

The off-gas assembly will be located outside the all-weather enclosure, as shown in Drawing P-3. This location was chosen as a convenient place to combine the collection and treatment needed for both the V-Tanks and the Consolidation Tanks. In addition, placing the off-gas system outside the all-weather enclosure greatly simplifies issues regarding decontamination of the enclosure in the unlikely event of an off-gas leak.

To monitor for unexpected S-GAC breakthrough and for added worker protection, the off-gas system will include provisions for monitoring of VOCs. Although specific off-gas monitors have not been selected, an Eco-Sensor Model C-21 or equal will be used for VOC monitoring. This unit is capable of measuring VOCs in the 50 to 100 ppm range and uses a heated metal oxide semiconductor sensor. Off-gas monitoring will be conducted as part of the on-going industrial hygiene activities.

4.3.12 Design of Backfill

The excavated area will be backfilled with pit-run material obtained from the TAN borrow pit. This material meets the AASHTO M145 standard, compacts easily, and provides structural stability. The TAN borrow pit has no known previous activities that would have contributed to radioactive or hazardous contaminants. Therefore, it is assumed that the borrowed material meets the institutional control criteria by having a Cs-137 concentration less than 2.3 pCi/g.

As discussed in the earthwork specifications (Attachment 2, Section 02200), the backfilled material will be placed in 8-in. lifts and compacted with three passes of a roller or mechanical vibrator. An estimated total of 3,539 yd³ of clean pit-run material will be needed.

The excavated areas shown in Drawing C-4 and C-5 will be graded with pit-run material only and not revegetated because this area will likely become disturbed during future TAN Completion Project activities.

4.3.13 Design for Miscellaneous Waste Addition

In addition to the V-Tank waste, several additional waste items will be transported to the V-Tank area, consolidated into the V-Tank waste stream, and treated. The waste items are listed in Table 7. Data for the miscellaneous waste streams are provided in EDF-4928 (Attachment 3). These waste items will be combined with the V-Tank waste as part of this RD/RAWP Addendum 2 (Revision 1) for consolidation and treatment.

Table 7 summarizes the miscellaneous waste items. The adjusted volume is the volume of waste in storage plus the estimated volume of rinse water needed to remove the waste from its container; the adjusted volume is the estimated total volume of waste that will be delivered to the Consolidation Tanks.

Table 7. Miscellaneous waste items for inclusion into the V-Tank waste.

Waste Item	Volume	Adjusted Volume
Liquids in V-Tank Lines	3 carboys (5 gal each packaged in a 30 gal drum	20 gal
Returned V-Tank Samples	<50 gal	50 gal
ARA-16 Waste	4.5 gal sludge 75.5 gal water	380 gal
OU 1-07B Sludge	3.2 gal	14.2 gal
Total		464.2 gal

4.3.13.1 Liquids in V-Tank Lines. During the TAN-616 decontamination and demolition and the Tank V-9 line isolation efforts (ICP 2004e), the lines between the V-Tanks and Building TAN-616 were cut and capped. These efforts resulted in the collection of 20 gal of waste. The waste is characterized identically to the waste currently in the V-Tanks because it was en route to the V-Tanks when operation ceased. The waste is contained in three 5-gal carboys and some sludge is packaged inside of a 30-gal drum.

4.3.13.2 Returned V-Tank Samples. During the various V-Tank investigations, additional sample material was collected and archived in the event that completed analysis indicated the need for additional analysis. Many of the samples were not used for characterization or the treatability studies and are no longer needed by the project. The waste is contained in numerous sample containers of varying sizes.

4.3.13.3 ARA-16 Waste. Waste from the ARA-16 remediation initially consisted of 4.5 gal of sludge and 312 gal of liquid. The waste is contaminated with a variety of organics, PCBs, and radionuclides. The radionuclides include transuranic elements; however, their concentration in the initial waste form was less than the 10 nCi/g limit for ICDF disposal (Sherwood 2003, and see Appendix B) and hence the waste is not classified as a TRU waste. The contents of the tank were classified as RCRA F-listed mixed waste. In accordance with the *Explanation of Significant Differences for the Record of Decision for the Power Burst Facility and Auxiliary Reactor Area Operable Unit 5-12* ([DOE-ID 2004i](#)), the waste that was removed from the ARA-16 Tank is to be treated in a facility approved for RCRA or TSCA-mixed waste. That ESD also called for subsequent disposal of residuals at the ICDF.

The waste has been removed from the ARA-16 tank using a peristaltic pump and placed in a 500-gal high-integrity container (HIC). The bulk of the liquid portion was removed from the HIC by initial pumping through dewatering internal filters within the container then passing the liquid through an activated carbon filter, and discharging the liquid into 55-gal drums. The activated carbon filter is proposed to be macroencapsulated and disposed of at the ICDF ([DOE-ID 2004i](#)). The 55-gal drums of liquid waste have been stabilized (so that no free liquid remains) and disposed of at the ICDF. The same peristaltic pump may be used to transfer the sludge remaining in the HIC to the V-Tanks treatment system. The volume of sludge remaining in the HIC is estimated to be comprised of 75.5 gal of water and the 4.5 gal of sludge from the ARA-16 tank. EDF-4928 in Attachment 3 gives the radiological and chemical characteristics of the sludge from the ARA-16 tank to be consolidated and treated. It is anticipated that these same characteristics will be present in the sludge remaining in the HIC. The radiation levels associated with this waste stream are 4.5 R at the bottom of the HIC with 2.5 R at the side. Therefore, appropriate shielding and PPE will be used in transferring the waste sludge from the HIC to the Consolidation Tanks.

4.3.13.4 OU 1-07B Sludge. The OU 1-07B sludge waste was generated in 1997 as part of sludge sampling activities performed in efforts to better characterize the waste material present within the TSF disposal well (TSF-05). The sludge was also collected for use in various treatability studies, including bench scale in situ chemical oxidation treatability studies. A number of extra samples were collected in case the planned analysis identified the need for further analyses. Many of the samples were not used for characterization or the treatability studies and are no longer needed by the project. There are 28 discrete sample vials partially filled with sludge material. The volume of sludge in the sample vials is estimated to be 3.2 gal (12 L) total.

Since the sludge was removed from the contaminated aquifer as part of a CERCLA action, it is CERCLA waste and carries a F001 waste code.

These samples have been analyzed for TCLP with results indicating that no other waste codes apply to the sludge material. The major contaminants in the waste are trichloroethene (TCE), tetrachloroethene (PCE), and cis- and trans-dichloroethene (DCE). Other contaminants present in the sludge material include low levels of Sr-90 and Cs-137.

There are approximately 3.2 gal (12 L) of this waste that will be added to the V-Tank consolidation and treatment process. In order to remove the 3.2 gal of waste, an additional 11 gal of water is estimated to be needed to flush the material out of its containers.

4.3.13.5 Miscellaneous Waste Transfer System Design. Although the characteristics of the four miscellaneous waste streams are compatible with the V-Tank waste, this addition will increase the concentration of several key components. As shown in Table 8, TCA concentration is increased; the ARA-16 waste is the key contributor. Additional details are provided in EDF-4928 given in Attachment 3.

The higher concentration of TCA will not adversely affect transfer operations. In addition, as discussed in Section 4.3.10, Phase 1 treatment will still be within acceptable limits. Air emissions for Phase 2 treatment will be addressed in Addendum 3 (DOE/NE-ID 2004a); however they are not expected to increase significantly over that which would be realized by processing only V-Tank waste.

As shown in Drawings P-1 and 628814, the ARA-16 waste will be pumped into the sludge transfer system upstream of pumps P-1 and P-5 using a separate line connected by valving. Two locations for this connection are available. Drawing 628814 shows the physical connections between the ARA-16 waste system and the V-Tanks sludge transfer system. To reduce operator exposure, the assembly shown in Drawing 628814 will be fabricated and connected to the V-Tank sludge transfer system prior to connecting to the HIC. The HIC containing the ARA-16 sludge will be brought in using a forklift or other appropriate means. Operators will remove the HIC lid and quickly replace it with the assembly, fasten the compression latches, and retreat to a shielded area.

The V-Tank line waste, the OU 1-07B sludge, and the returned V-Tanks samples will be consolidated into drums or carboys prior to transferring the waste into the V-Tank sludge transfer system. The same system shown in Drawing 628814 will be used for this transfer.

The INEEL work control process will be used to develop specific work orders for the transfer of the miscellaneous waste to the Consolidation Tanks. The work order process includes extensive provisions for health and safety protection, radiation protection, and environmental compliance.

This consolidation effort will reduce overall environmental remediation costs while remaining in compliance with both Records of Decision. (DOE-ID 2000b, and DOE-ID 2004b).

Table 8. Concentrations of key components following miscellaneous waste consolidation (EDF-4928).

		V-Tank Contents	Additional Waste	Composite Waste	Percent Change from V-Tank Contents to Composite
	Units	Concentration	Concentration	Concentration	
Cd	mg/kg	2.34E+00	4.12E+00	2.37E+00	1.0
Chloride	mg/kg	1.06E+02	2.49E+02	1.08E+02	1.8
Hg	mg/kg	7.92E+01	2.57E+02	8.15E+01	2.9
Aroclor-1260	mg/kg	1.80E+01	2.18E+01	1.80E+01	0.3
bis(2-ethylhexyl)phthalate	mg/kg	4.54E+02	2.45E+02	4.51E+02	-0.6
PCE	mg/kg	1.18E+02	1.07E+02	1.18E+02	-0.1
TCA	mg/kg	5.22E+01	9.85E+02	6.43E+01	23.3
TCE	mg/kg	4.26E+02	2.32E+03	4.51E+02	5.8
Toluene	mg/kg	6.10E+00	3.64E+01	6.49E+00	6.5
Cs-137	nCi/g	9.88E+02	1.34E+03	9.92E+02	0.5
Sr-90	nCi/g	1.84E+03	1.32E+03	1.84E+03	-0.4
Tritium	nCi/g	2.56E+01	3.83E+01	2.58E+01	0.6
TRU	nCi/g	4.28E+00	7.68E+00	4.32E+00	1.0

4.4 Equipment Components and Instrument List

The critical equipment, components and instruments needed for the waste consolidation activities are itemized in Table 9 below. These items are also shown in Drawings P-1 and P-2. SPC-555 in Attachment 2 provides additional detail. Minor items are not listed below.

Table 9. Key equipment needed for waste consolidation and Phase 1 treatment.

Quantity	Item Description
3 ea.	8,000-gal stainless steel storage tanks
1 ea.	Secondary waste containment pan, 8,300-gal minimum
3 ea.	10-hp pumps for Consolidation Tanks
3 ea.	5-hp mixer and motors for Consolidation Tanks
3 ea.	Air sparge rings for Consolidation Tanks
1 ea.	Compressor to supply sparging air and pump-motor air
3 ea.	Level indicator, transmitter, and alarm for Consolidation Tanks
6 minimum	Granular activated carbon absorber units, sulfur impregnated
3 minimum	HEPA-filter blower assemblies
As needed ^a	Differential pressure indicator and transmitter for HEPA filter
3 ea.	Air blower for off-gas system (may be combined with HEPA blower assemblies)
As needed ^a	Television monitors for video surveillance of sludge removal; one for each V-Tank and one for the Consolidation Tank assembly.
As needed ^a	Television cameras for inside of each V-Tank and Consolidation Tank

Table 9. (continued).

Quantity	Item Description
3 ea.	Directional spray nozzles for Tanks V-1, V-2, and V-3
1 ea.	Straight spray nozzle for Tank V-9
1 ea.	Straight spray nozzle and manual extension rod assembly
2 ea.	5 hp air-operated or electric reversible pump for suctioning V-Tanks
3ea.	Air-operated, double-diaphragm pump for mixing each V-Tank
As needed	Stainless steel piping
As needed	High-density polyethylene piping
Numerous	Valves and flanges
As needed ^b	Weather enclosure heaters

a. See Drawing P-2, P-2A and P-2B for specific number.

b. See Drawing HV-1 for specific number.

4.5 Drawings and Specifications

The drawings and specifications that support implementation of the remedial design are listed below in Table 10 and Table 11, respectively; Table 11 is the table of contents for the engineering and procurement specification. As indicated in these tables, most of the information is included in Attachments 1 and 2. The drawings that are not included in Attachments 1 and 2 contain detailed fabrication or installation information and are available for information if requested.

4.6 Design Calculations

The calculations that support the design and ARAR compliance are listed below in Table 12. As indicated in the table, certain key calculations are included in Attachment 3. The remaining calculations are available for information upon request.

Table 10. Design drawings.

DWG No.	A-E Sheet No.	Revision ^a	Title	Included in Attachment 1
628442	T-1	0	TAN Area And INEEL Site Maps	Yes
628443	T-2	4	Drawing Index	Yes
628444	C-1	2	Site Plan and Detail	Yes
628445	C-2	1	Site Plan	Yes
628446	C-3	0	Pump Access Excavation Plan - Phase One	Yes
628447	C-4	0	Tank and Soil Remediation Excavation Plan - Phase Two and Three	Yes
628448	C-5	0	Soil Remediation Excavation Plan Sites 1 And 2	Yes
628449	C-6	1	Soil Remediation Excavation Plan - Phase Three	Yes
628450	C-7	1	Sections and Detail	Yes
628451	C-8	0	Sections and Details	Yes
628452	C-9	2	Soil Staging Area Plan	Yes

Table 10. (continued).

DWG No.	A-E Sheet No.	Revision ^a	Title	Included in Attachment 1
628453	C-10	1	Final Grading Plan	Yes
628454	C-11	1	Existing Grade Plan	Yes
628455	C-12	1	Finished Grade Plan	Yes
628456	C-13	1	Sections and Detail	Yes
628457	C-14	2	Tank Removal Option 1, Tank Rigging Plan - Excavation to Staging Area	No
628458	C-15	0	Tank Removal Option 1, Tank Rigging Plan – Staging Area to Transporter	No
628459	C-16	2	Tank Removal Option 2, Tank Rigging Plan – Excavation to Transporter	No
628460	C-17	0	Tank Rigging Plan - Off-Load Tanks at ICDF	No
628461	C-18	0	Rigging Details and Sections	No
628462	S-1	1	Isometric Views	Yes
628463	S-2	1	Tank Support Skid and Containment Pan Plan and Views	Yes
628464	S-3	1	Tank Support Skid Plan, Section, and View	No
628465	S-4	2	Containment Pan Plans, Section, and Details	Yes
628466	S-5	1	Steel Shielding Plan, Views, Section, and Detail	No
629013	S-6	0	Steel Shielding Views	No
629014	S-7	0	Steel Shielding Section and Isometric View	No
629029	S-8	0	Shielding Plan	Yes
628467	P-1	2	P&ID	Yes
628468	P-2	2	P&ID	Yes
629153	P-2A	0	Off-gas P&ID	Yes
629159	P-2B	0	Scrubber Skid P&ID	Yes
628469	P-3	1	Site Plan	Yes
628470	P-4	1	Enlarged Piping Plan A, Details and Section	Yes
628471	P-5	1	Detail and Section	Yes
628472	P-6	2	Tank Drainage Steps	Yes
628473	P-7	1	Tank Drainage Steps	Yes
628474	P-8	1	Enlarged Piping Plan B and Pipe Supports	Yes
628475	P-9	1	Section	No
628476	P-10	0	Receiving Tank Plan, Elevation, Detail and Sections	Yes
629154	P-11	0	Off-gas Equipment Plan and Section	Yes
629155	P-12	0	Off-gas Equipment Plan and Parts List	Yes
628477	HV-1	0	HVAC Sprung Structure Plan	No
628478	E-1	2	One Line Diagram	Yes

Table 10. (continued).

DWG No.	A-E Sheet No.	Revision ^a	Title	Included in Attachment 1
628479	E-2	0	Overall Plan View	No
628480	E-3	2	Enlarged Electrical Plan	Yes
628481	E-4	0	Power Pole Photos – Demolition	No
628482	E-5	0	Power Line Details – Install	No
628483	E-6	1	Transformer Detail	No
628484	E-7	1	Pump Control Panel Detail	No
628485	E-8	1	Pump Control Panel Schematic Diagram	Yes
628486	E-9	1	Mixer Motor Panel Detail	No
628487	E-10	1	Recirculation Pump Motor Panel Detail	No
628488	E-11	1	Recirculation Pump and Mixer Motor Panel Schematic Diagrams	Yes
628489	E-12	1	Tank Level Monitoring Panel Support Frame Detail	No
628490	E-13	1	Tank Level Monitoring Panel and Junction Box Details and Sections	No
628491	E-14	1	Tank Level Monitoring Wiring Diagram	Yes
628492	E-15	1	High-High Level Secondary Shutdown Panel Support Frame, Wiring Diagram and Detail	No
628493	E-16	1	VFD Panel Detail	No
628494	E-17	1	VFD Wiring Diagram and Pump Level Control Ladder Diagram	Yes
628814		0	Sludge Transfer System ARA-16 Site Plan, Details and Sections	Yes

a. Revision numbers indicate the revision at the time of publication of the RA/RA Work Plan Addendum 2 (Rev 1). Further revisions of the drawings may be needed but will not necessitate a revision to this document.

Table 11. Design specifications.

Division	Included in Attachment 2?
DIVISION 1--GENERAL REQUIREMENTS	
01005 SUMMARY OF WORK	Yes
01300 SUBMITTALS	Yes
DIVISION 2--SITE WORK	
02140 TEMPORARY DIVERSION AND CONTROL OF WATER DURING CONSTRUCTION	No
02200 EARTHWORK	Yes
DIVISION 5--METALS	
05100 STRUCTURAL STEEL AND MISCELLANEOUS METALS	No
DIVISION 13--SPECIAL CONSTRUCTION	
13207 TANKS	Yes
DIVISION 15--MECHANICAL	
15024 PRESSURE PIPING/VESSEL WELDING	Yes
15203 PROCESS PIPING	Yes
15800 HEATING SYSTEM	No
DIVISION 16--ELECTRICAL	
16000 ELECTRICAL GENERAL PROVISIONS	No
16109 SWITCHES, RECEPTACLES AND WALL PLATES	No
16110 ELECTRICAL RACEWAYS	No
16120 CABLE, WIRE, CONNECTORS AND MISCELLANEOUS DEVICES	No
16124 INSULATED MEDIUM VOLTAGE CABLE AND CONNECTORS	No
16155 MOTOR STARTERS (<600 VAC)	No
16160 PANELBOARDS	No
16195 ELECTRICAL IDENTIFICATION	No
16414 MEDIUM AND HIGH VOLTAGE POLE HARDWARE AND EQUIPMENT	No
16450 GROUNDING	No
16462 TRANSFORMERS, PAD MOUNTED, LIQUID FILLED, POWER	No
16810 INSTRUMENTATION	No

Table 12. Key design calculation summary.

Document Number	Title	Scope	Included in Attachment 3?
EDF-4602	TSF-09/18 V-Tank Contents Removal and Site Remediation; miscellaneous calculations	Material selection, V-Tank corrosion, Consolidation Tank corrosion, activated carbon for off-gas system, waste agitation and sparging, and waste recirculation.	Included
EDF-4604	Shielding and Exposure Calculations for V-Tank Waste Process Activities	Shielding of Consolidation Tanks and V-Tank operational areas	Included
EDF-4672	TSF-09/18 V-Tank Contents Removal and Site Remediation; site work design	Earth work, excavation, backfill, and tank rigging	Included
EDF-4751	V-Tanks Contents Remediation Mechanical Design	Mechanical design of the contents removal system. Pump and pipe sizing, and equipment selection is included.	Included
EDF-4885	Reevaluation of Characteristic Toxicity Designation for V-Tank Waste, Using Existing Sample Data	This EDF reevaluates the analytical information available to determine whether the V-Tank waste should be designated as a noncharacteristic waste.	Included
EDF-4928	Potential Feed Streams for Inclusion in V-Tank Treatment Process	Discusses the characteristics of the four miscellaneous waste items that will be added to the V-Tank waste. Other waste streams are also discussed.	Included
EDF-4956	Off Gas Design System, Sparge, TSF-09/18 V-Tanks Contents Removal and Site Remediation	Addresses off-gas flow, design and sizing of GAC and HEPA filters, change-out frequency, and air stripping.	Included
EDF-5017	Secondary Containments and Support Skid Design for V-Tanks Consolidation Tanks	Design calculations for the secondary containment and supporting skid for the consolidation tanks. Ground support and seismic calculations are included.	Included
EDF-5196	Supporting Calculations for APAD 04-53 TAN V-Tanks Remediation TSF-09 TSF-18	Provides the calculations for the emission rates based upon the waste inventory.	Included

5. ENVIRONMENT, SAFETY, HEALTH, AND QUALITY

5.1 Environment

Compliance with environmental requirements that are identified as ARARs for the V-Tanks remediation are incorporated into the remedial design. Work activities will be completed in accordance with the project-specific environmental checklist (TAN-99-008).

5.2 Safety and Health

Worker safety and health will be ensured through compliance with the project Health and Safety Plan (HASP) (ICP 2004d) and implemented through INEEL work control processes. Goals will be developed for project personnel performing radiological work that are as low as reasonably achievable (ALARA). Safety work documents, such as radiation work permits, job safety analyses, and a hazard profile screening checklist will be developed in accordance with existing INEEL procedures and systems to implement the HASP requirements. They will be modified, supplemented, or generated (as necessary) during work activities to address changing conditions or revisions to work methods described in the planning documents.

The hazard classification for V-Tank activities is designated as a “Less Than Category 3 Nuclear Facility.” The safety category designation assigned to these activities, in accordance with Management Control Procedure (MCP)-540, “Documenting the Safety Category of Structures, Systems, and Components,” will be consumer grade or Quality Level 4. Appendix D provides the safety category evaluation documentation. The detailed assessment is provided in the hazard assessment document (HAD-305) and the associated calculations (EDF-4977).

5.3 Quality

The design and fabrication of the equipment necessary for waste consolidation will be in accordance with appropriate quality assurance requirements to produce a “consumer grade” level of equipment. The radioactive nature of V-Tanks contents requires compliance with the Price Anderson Amendments Act (42 USC 2210). The requirements given in 10 CFR 830, Subpart A, are applicable to this work.

Sample data quality will be controlled by compliance with the Quality Assurance Project Plan (DOE-ID 2004e).

6. REMEDIAL ACTION WORK PLAN

Implementation of the remedial design will include a sequence of tasks to safely and efficiently remove and consolidate the contents from the V-Tanks, treatment of the V-Tank contents, characterize the V-Tank waste, remove the V-Tanks and piping, excavate contaminated soil, properly store, transport, and dispose of contaminated materials, and backfill and restore the site. This section provides a description of the work activities and work sequence to accomplish the remedial action. Additional detail is provided in the design drawings (Attachment 1), the technical specifications (Attachment 2), and operational procedures that will be developed.

6.1 Project Controls

Project controls include field oversight and construction management, access control, and protocol and coordinating field oversight, the project cost estimate, and the project schedule. These items are described in the following sections.

6.1.1 Field Oversight and Construction Management

The DOE Idaho Operations Office (DOE Idaho) Remediation Project Manager is responsible for notifying the EPA and DEQ of project activities. The Project Manager also serves as the single interface

point for all routine contact between the Agencies and the INEEL Management and Operations (M&O) contractor and any subcontractors.

The INEEL M&O contractor will provide field oversight and management services for this project. The INEEL M&O contractor or associated subcontractors will also provide field support services for health and safety, radiological control, environmental compliance, quality assurance, and landlord services.

The specifications provided in Attachment 2 identify work that may be conducted by either the INEEL M&O contractor or a subcontractor. For the purposes of this RD/RAWP, the terms contractor and subcontractor should be considered interchangeable; the INEEL M&O contractor (BBWI or its successor) is responsible for ensuring the work is completed in a safe and compliant manner.

Visitors to the Site who wish to observe activities must meet badging and training requirements necessary to enter INEEL facilities. Training requirements for visitors are described in Section 6 of the Project HASP (ICP 2004d).

6.1.2 Protocol and Coordination of Field Oversight

The DOE will notify the EPA and DEQ WAG managers of pending remedial action activities, such as project startup, closeout, and inspections. Activities related to preliminary inspections, the prefinal inspection, and the final inspection are included in Section 6.3.

6.1.3 Project Cost Estimate

The cost estimate summary for the V-Tanks remedial action addressed by this work plan is presented in Appendix C.

6.1.4 Project Schedule and Deliverables

The deliverable schedule with the planned/working schedule dates and the enforceable dates through the completion of the remedial action is provided in Table 13. The working schedule for the remedial action is an accelerated schedule that does not include contingency for delays in administrative activities, document reviews, or for delays to field activities due to inclement weather.

Table 13. Deliverable schedule for the V-Tank/contents removal and site remediation.

Activity	Planned Start Date	Planned Completion Date	Document Type/ Review Period	Enforceable Milestone
Remedial Design (Group 2 RD/RAWP Addendum 2)				
Submit Draft OU 1-10 Group 2 RD/RAWP Addendum 2 to Agencies for review	N/A	6/28/04	Primary ^b	N/A
Agency review of Draft Group 2 RD/RAWP Addendum 2	6/29/04	8/5/04	21 ^b	
Agency agreement on resolutions to Agency comments and concurrence to allow tank contents removal to proceed	N/A	9/13/04	11 ^b	
OU 1-10 Group 2 RD/RAWP Addendum 2 finalized and issued	N/A	9/24/04	11 ^b	

Table 13. (continued).

Activity	Planned Start Date	Planned Completion Date	Document Type/ Review Period	Enforceable Milestone
V-Tanks Waste Removal and Consolidation				
Site preparation	6/15/04	10/25/04		
Mobilize for soil excavation and V-Tank removal	9/20/04	N/A		
Complete waste consolidation and V-Tank removal		1/31/05		
Agency pre-final inspection Part 1		11/2/04		
Submit pre-final inspection report Part 1 for Agency review		1/06/05	Secondary	
Agency review pre-final inspection report, Part 1	1/09/05	1/23/05	15 ^c	
Agency pre-final inspection Part 2		12/19/04		
Submit pre-final inspection report Part 2 for Agency review		2/17/05		
Agency review pre-final inspection report, Part 2	2/20/05	3/6/05	15 ^{cd}	
Complete V-Tank site backfill and restoration	N/A	6/3/05		
Agency pre-final inspection Part 3		6/30/05		
Submit pre-final inspection report Part 3 for Agency review	N/A	7/31/05	Secondary	
Agency review pre-final inspection report, Part 3	8/01/05	8/15/05	15 ^c	
Complete V-Tank implementation of institutional controls (if required) ^c	N/A	12/05/05		
OU 1-10 Groups Remedial Action Report				
The schedule for the Group 2 Remedial Action Report will be provided in the Group 2 RD/RAWP Addendum 3 for tank contents treatment and disposal				
<p>a. Review periods, except as noted, are consistent with Section 8.13 of the FFA/CO (DOE-ID 1991) and are stated in calendar days.</p> <p>b. Expedited primary document was planned with shortened review periods and without a draft final submittal.</p> <p>c. A 15-day review period is provided to expedite completion of the pre-final inspection process.</p>				

6.2 Remedial Action Work Tasks

The following subsections provide descriptions of the remedial action work tasks planned for implementing the V-Tanks Contents Removal and Site Remediation. The applicable drawings and specifications are provided in Attachments 1 and 2, respectively. The project supporting documents referred to in this section are identified in Section 1.1.2 and further described in Section 6.5. Most tasks described below also include a bulleted list of actions that should be conducted as part of the task. These items are intended to provide an overview of the task and are not intended to be an all-inclusive basis for work control documents or of the final sequence.

6.2.1 Premobilization

Prior to mobilization, as each task is undertaken, all associated documentation to support the work control for that given task will be prepared and approved in accordance with the Integrated Safety

Management System (ISMS). These activities, which ensure readiness prior to mobilization, include the generation of the following documents, plans and reviews for each major portion of the remedial action:

- Job safety analyses
- Safe work permits
- Notice of CERCLA disturbance
- Radiological work permits
- ALARA reviews
- Confined space entry permits
- Work control documents (procedures and work orders).

Additional premobilization activities include:

- Subsurface investigations to identify lines, utilities, and subsurface structures
- Preparation of lift plans (if necessary)
- Prejob briefings
- Equipment procurement
- Mockup testing of the sludge removal system to ensure that all equipment operates properly and is configured as planned for field use.

6.2.2 Storm Water Control

Storm water will be controlled during remedial action so that storm water does not carry contamination from the contaminated site to adjacent non-contaminated areas. Storm water will be managed to minimize flow either onto or off of the site. Storm water may be left to infiltrate the soil. Because the TSF area at TAN is outside the storm water corridor, a storm water pollution prevention plan is not required.

6.2.3 Mobilization and Setup

Mobilization activities will begin with soil grubbing for the installation of the temporary soil and tank storage area. Next, the area around the V-Tanks will be grubbed as necessary and graded to ensure that precipitation does not drain toward the V-Tanks work area. Earth-moving equipment, such as the trackhoe and Utilivac will be parked in the V-Tanks area close to where it will be needed for excavation.

Work control boundaries will be established around the V-Tanks area. Temporary fencing will be used to establish the traditional work zones: exclusion zone (Hot Zone), contamination reduction zone (decontamination zone), and support (clean) zones. A level and stable area for the crane will be established in the support zone to ensure safe lifting of the tanks.

The key actions for the mobilization and setup task are itemized below:

- Soil grubbing in equipment installation area, all-weather enclosure area, and soil storage area.

- Soil grading and compaction for equipment stability
- Installation of a gravel pad for the Consolidation Tanks and other heavy equipment
- Soil grading to promote proper drainage
- Establish work control boundaries.
- Construction of the all-weather enclosure.

6.2.4 Site Access Control

The V-Tanks area is located within the TAN Technical Support Area, which is fenced and patrolled to prevent unauthorized access. In addition, specific site access control will be provided in accordance with the project HASP (ICP 2004d) to ensure that unauthorized personnel are not allowed access and that site conditions are controlled at all times during remediation activities. The V-Tanks excavation, area of contamination, and the all-weather enclosure area will be fenced to prevent inadvertent worker intrusion into the area. Appropriate signs will be placed to alert workers of the hazards.

The key actions for the site access control task are itemized below:

- Establish fencing for site access control
- Place appropriate signs to alert workers of hazards and provide contacts (persons and phone numbers) for access
- Establish visible entry and egress route.

6.2.5 Tank System Release Soil Removal, Sampling, and Risk Assessment (Contingency Task)

NOTE: *This task is a contingency task that will only be required if visual inspection and/or radiation survey identifies evidence of a release from the V-Tank system (tanks, valves, or piping). This task may be implemented at any phase of the soil excavation for tank and piping removal as addressed in the subsequent subsections.*

- Photograph the release and record the land survey coordinates (horizontal and vertical) of the release location.
- Remove and containerize the contaminated soil (based on visual evidence and radiological survey).
- Sample the contaminated soil as necessary for waste characterization.
- Continue with soil removal as required to meet the current soil FRG of 23.3 pCi/g for Cs-137. (If soil is excavated beyond 10 ft below original ground surface, the soil above 23.3 pCi/g may be left in place with Agency concurrence.)
- After soil removal is completed per the previous step, sample the soil directly below the release location in accordance with the RCRA/HWMA sampling requirements in the project FSP (see Section 6.5.1).

- Evaluate sampling results per the Risk-Based Screening and Assessment Approach for Waste Area Group 1 Soils (INEEL 2004b). If this screening evaluation indicates a potential need for further remediation, then additional characterization data will be gathered as necessary to support application of this risk-based screening and assessment approach for the entire remediation area.

6.2.6 Phase 1 Soil Excavation

Contaminated soils will be excavated to the extent indicated on the design drawings and specifications for the V-Tanks as shown in Drawings C-3 and C-7 of Attachment 1. The purpose of Phase 1 excavation is to gain access to the top of the tanks and associated piping to allow for piping removal and installation of contents removal equipment. Soil excavation during Phase 1 is minimized so that the remaining soil provides added shielding.

During this phase, pipes exposed during the excavation will also be cut, capped, and removed for disposal. Drawing C-3 provides details regarding which pipes will be removed. As piping is exposed it will be cut and removed, then packaged for disposal. Any remaining pipe stubs will be sealed by capping. Although liquids in the pipes should have been removed in previous efforts, for safety and environmental protection, the project is anticipating the existence of liquids in the lines. Therefore, operational procedures will be developed to capture residual liquids which will be returned to the V-Tanks for transfer and processing with V-Tanks contents. In addition, the pipe capping will be photographed for the project record.

Precautions such as water spray, wind monitoring, and visual observations will be used to prevent the generation of fugitive dust. Air monitoring requirements will be specified by a radiological control engineer and a certified industrial hygienist. Wind monitoring and visual observations to control fugitive dust will be performed by the industrial hygienist or site health and safety officer. Personal protective equipment, when required, will be used as specified in the project HASP (ICP 2004d), job safety analysis documents, applicable radiation work permits, and as determined by the safety officer and/or the certified industrial hygienist present at the job site.

Equipment necessary for excavation of the contaminated soils can remain within the decontamination control zones until completion of excavation activities. Barriers, such as tarps and containment pads, will be used to separate the equipment and vehicles that are used to haul excavated soil from the area to prevent the spread of contamination. These vehicles will not be driven directly onto contaminated areas. This strategy will minimize the spread of contamination and reduce the need to perform any additional decontamination.

Excavated soil will be transported to the soil staging area for temporary storage as bulk material. If the soil does not meet radiological control criteria, it will be placed in large soil bags or roll-off containers, which will be stored in the soil storage area. With the approval of the ICDF contractor, the Field Engineer may elect to transport the soil directly to the ICDF.

The key actions for the Phase 1 soil excavation task are itemized below:

- Establish precautions to prevent the generation of fugitive dust
- Establish air monitoring as determined necessary to support certified Industrial Hygienist and Radiological Control Engineer
- Establish contamination control barriers

- Excavate to the extent necessary to expose tank and piping
- Transport excavated soil to the soil staging area, bag soil as necessary, or transport to the ICDF as directed by the Field Engineer
- Cut cap and remove piping as indicated on drawings
- If liquid is present in pipes, collect, store, and return to V-Tanks or Consolidation Tanks
- Package removed piping for disposal
- Photograph capped pipe ends and note their specific location.

6.2.7 System Mockup Testing

System mockup tests of the sludge removal system are being conducted off-Site to minimize design errors and to ensure that the fabricated equipment functions as intended. A simulated sludge will be used to determine if the sludge can be circulated without plugging.

The mockup tests are also used to train the operators, which will minimize operational problems, delays, and exposure during actual operations. Lessons learned from the mockup tests will be incorporated into the design and procedures prior to field deployment of the equipment.

The key actions for the System Mockup Testing task are itemized below:

- Set up sludge removal equipment and demonstrate equipment efficacy
- Modify equipment as necessary to produce desired results
- Train operators on proper handling of equipment
- Incorporate design changes into a revised design (if necessary)
- Verify and/or modify operating procedures.
- Mockup test results are described in “V-Tank Closure: Report on V-Tank Mock-up Testing” (ICP 2004g).

6.2.8 Management Self-Assessment

A management self-assessment (MSA) is a methodical process used by INEEL management to affirm that an activity is at a state of readiness to commence. This will be a graded-approach MSA in which only those higher risk activities will be reviewed and separately approved to proceed with operations.

The MSA process generally includes a thorough review of the safety basis and associated documentation, equipment, personnel, personnel training, and procedures to ensure that the activity can proceed safely and in compliance with applicable requirements. The MSA will be conducted in accordance with the methods established in MCP-1126, “Performing Management Self-Assessments for Readiness,” which provides detailed guidance on the topics for evaluation. The MSA process culminates in a formal management decision to commence operations.

- Conduct a management self-assessment in accordance with MCP-1126.

6.2.9 Prefinal Inspection – Part 1

Following the MSA, the Agencies will conduct a prefinal inspection to evaluate if the consolidation and treatment equipment has been properly installed. Additional information regarding the prefinal inspection process is given in Section 6.3.1

6.2.10 Equipment Installation

Equipment will be installed in three areas: outside at the V-Tank area, inside the all-weather enclosure, and adjacent to the all-weather enclosure. The equipment to be installed at the V-Tanks area after Phase 1 soil excavation includes the following items:

- Pumps P1 and P5
- Piping as shown in Drawings P-2 through P-12
- Video monitoring equipment
- Suction and spray nozzles.

The equipment to be installed inside or adjacent to the all-weather enclosure includes the following items:

- Three Consolidation Tanks and associated pumps, pipes, valves, etc.
- Secondary containment pan and assembly
- Active off-gas filtration system for the V-Tanks and Consolidation Tanks.

Equipment that is to be inside of the all-weather enclosure, including the shield walls, will be placed prior to erection of the all-weather enclosure over the equipment.

The pumps, piping, and off-gas system are assembled to expedite installation. These items may be installed anytime after the premobilization. During installation of the suction and spray nozzles, the off-gas system blowers will be operated to draw air through the open manways and through the HEPA/S-GAC filtration system. The blowers will maintain the face velocity at the manways at a sufficient flow to reduce the potential of contamination spread from the V-Tanks.^j Once the equipment is installed, a flexible membrane will be installed around the manway as shown in Drawing P-6. Although airflow through the V-Tanks will be reduced when the membrane is installed, ambient air will be bled into the off-gas system at a high-flow rate. This addition of high-flow ambient air is needed to maintain contamination control in the V-Tanks in the event of a rupture in the flexible membrane.

After installation of the Consolidation Tanks is complete, a qualified, registered, professional engineer will inspect the installation for evidence of weld breaks, punctures, cracks, and other discrepancies in accordance with 40 CFR 264.192(b). All discrepancies will be resolved in an inspection report prior to use of the tank for hazardous waste operations.

j. See EDF-4956 in Attachment 3 for specific airflow requirements.

6.2.11 System Operability and Leak Testing

Individual components and assemblies will undergo system operability (SO) testing with the vendor or at the point of manufacture prior to delivery to the V-Tanks project. The SO test will confirm the functionality and operability of the components and assemblies. This SO testing will be conducted in accordance with established INEEL protocols, specifically MCP-3056, "Test Control." In addition, following equipment installation, the complete system will be subjected to an integrated functional test and an in-service leak test in accordance with applicable piping standards.

The key actions for the Integrated Functional and Leak Testing task are itemized below:

- Conduct functional test of all equipment, sensors, and valves
- Check all pipe flanges, valves, and pumps for leaks.

6.2.12 Removal of Tank Contents and Waste Consolidation Operation

Waste removal from the V-Tanks will occur through implementation of several steps as described below.

6.2.12.1 Supernatant Removal. Tank V-3 contains approximately 7,660 gal of relatively clean supernatant. The first waste removal step is to suction the supernatant out and pump it to Consolidation Tank T-3. Because the supernatant is relatively clean, it will be used in subsequent steps for rinsing of the V-Tanks.

As the suction end approaches the sludge layer the operators will use the television monitors to visually determine if sludge is being entrained. At that point, supernatant withdrawal will generally be manually terminated. The operators will use visual and radiation monitoring to mitigate sludge being transferred with the supernatant. At the completion of this step it is expected that approximately 12 in. of supernatant will be left on top of the sludge. Should the visual inspection not be sufficient to determine if sludge is being removed with the supernatant, a separate method to assist in this determination is to monitor the radiation field at the suction line. It is anticipated the radiation levels will rise noticeably since the radioactive contaminants are primarily found in the solid phase of the waste. Should this condition arise, the pump will be shut off manually.

The key actions for the supernatant removal task are itemized below:

- Suction the supernatant from Tank V-3 and discharge to the designated Consolidation Tank
- Visually observe the draw-down of the supernatant to ensure sludge layer is not also withdrawn
- Monitor the radiation readings of the supernatant as a qualitative measure to ascertain if sludge is being withdrawn. A high reading would indicate the presence of sludge. In this case, reduce the flow, move the suction wand, or terminate operations as directed by the Field Engineer.

6.2.12.2 Sludge Removal. In this step sludge is transferred from the V-Tanks to Consolidation Tank T-1 or T-2. Tank V-3 will be first to have its sludge removed, followed by the other V-Tanks. The designated Field Engineer will make the decision regarding on the order for pumping the other V-Tanks and the order for filling the Consolidation Tanks. The sludge may be divided in approximately equal amounts between Consolidation Tank T-1 and T-2 (designated as V-TANK-REM-T-1 and V-TANK-REM-T-2, respectively in Drawing P-2).

To remove the sludge, operators will initiate flow through the double-diaphragm pump. This action will mix the tank contents and loosen the sludge layer. Once the sludge is well mixed, Pump P1 or P5 will be activated to transfer the mixture to the Consolidation Tanks. If sludge remains in the tank, operators will maneuver the suction pipes (shown in Drawing P-6) in the V-Tanks to spray supernatant or clean water directly onto the sludge; the same nozzle can then be used to suction the sludge out. Video cameras will assist the operators in positioning the suction nozzles.

Due to the presence of a baffle and the large-particulate nature of the sludge in Tank V-9, the sludge is expected to be more difficult to remove than for the other tanks. To loosen the sludge behind the baffle, a Hotsy steam cleaner or the supernatant spray wand used for Tanks V-1 through V-3 will be available to spray hot water onto the caked sludge. Fluid for the spray nozzles will be supplied from the supernatant tank, a V-Tank, or clean water. Clean water is the least desirable source because it would add to the volume of waste requiring subsequent treatment. The force from the spray nozzles is expected to loosen the caked sludge and allow it to fall to the conical bottom where it will be suctioned out.

If the sludge behind the baffle cannot be removed with the aforementioned devices, provisions have been made in the shield plate to enable the drilling of a new hole on top of Tank V-9.

Tank V-9 sludge will be split between the Consolidation Tank T-1 and T-2. This division will enable better mixing and more uniform treatment. After rinsing of the V-Tanks is completed (See Section 6.2.10.3 below) the remaining supernatant in Consolidation Tank T-3 will be transferred to Consolidation Tanks T-1 and T-2.

The key actions for the sludge removal task are itemized below:

- Transfer sludge from Tank V-3 to Consolidation Tank T-1 and/or T-2
- Transfer sludge from Tank V-1, V-2, and V-9 to Consolidation Tanks T-1 and/or T-2^k.

Operating procedures or work orders will be developed that provide specific details on how this task will be accomplished.

6.2.12.3 Tank Flushing and Rinsing. Although suctioning is expected to remove most of the sludge, some sludge may remain. Therefore, spray nozzles and the spray wand will be maneuvered to rinse residual sludge towards the sumps of Tanks V-1, V-2, and V-3 and to the conical bottom of Tank V-9. This flushing step is expected to be akin to washing a sidewalk with sludge being pushed by the spray. Rinse water will be provided from Consolidation Tank No 3, which will be initially filled with supernatant removed from Tank V-3. In addition, the Field Engineer may invoke an option to pump the sludge and water from any of the V-Tanks to a spray nozzle, or add clean water. The mixture of sludge and rinsing water will be suctioned out from the sump (or conical bottom) and pumped to the Consolidation Tanks T-1 and T-2.

Once the sludge is flushed and suctioned out, all internal surfaces of the V-Tanks will be rinsed with the jet spray nozzles. The rinse water will be collected in the sump or conical bottom and pumped to the Consolidation Tanks.

The process of tank flushing and rinsing will be repeated as needed to achieve the level of cleanliness necessary to remove the sludge and thus render the V-Tanks LDR compliant.¹ Debris in the

k. The order will be specified by the Field Engineer through the INEEL work control process.

V-Tanks, such as personnel protective equipment, sampling tools, and other miscellaneous non-sludge type items will be left in the tanks; no attempt will be made to remove them. Once the tank flushing and rinsing step is complete, any remaining supernatant in Consolidation Tank T-3 may be transferred to the other Consolidation Tanks.

At the completion of each flushing or sludge removal campaign, the waste transfer lines will be blown out to reduce the potential for equipment freezing and contamination spread.

The key actions for the tank flushing and rinsing task are itemized below:

- Maneuver spray nozzles in each V-Tank and spray supernatant residual sludge towards each tank's sump (or conical bottom for Tank V-9)
- Suction sludge and rinse water out of each V-Tank and discharge to the Consolidation Tank T-1 or T-2
- Rinse internal surfaces of each V-Tank with supernatant or clean water
- Blow down the waste-transfer lines at the completion of each sludge transfer or tank rinsing campaign
- After achieving desired cleanliness, the Field Engineer may elect to transfer the remaining supernatant from Consolidation Tank T-3 to Consolidation Tank T-1 or T-2.

6.2.12.4 Visual Inspection and Tank LDR Compliance. Each tank will be visually inspected with the remote video cameras to ascertain the degree of cleanliness. To achieve LDR compliance, it is estimated that an amount of sludge equal to no more than 0.5 in. of undiluted sludge can remain in Tanks V-1, V-2, and V-3 (excluding the sumps). However, the suctioning and rinsing techniques described above are anticipated to leave much less than 0.5 in. of residual material.

To be disposed of at the ICDF the V-Tanks must meet land disposal restrictions provided in 40 CFR 268. For example, the concentration-based requirement for TCE is 6.0 mg/kg. The tanks to be disposed of are each considered to be a unique waste item, which includes the mass of the tank plus the mass of any sludge remaining in the tank. A goal of the remediation project is to remove as much sludge as possible so that the contamination remaining in any residual sludge does not cause the bulk-average concentration of the tank to exceed the LDR standard. Preliminary calculations indicate that to meet LDR standards for Tanks V-1, V-2, and V-3, the project should leave no more than 0.5 in. of sludge in those tanks (excluding the sumps). These preliminary calculations are based upon concentrations reported in 2003 (INEEL 2003b) and the conservative assumption that the preremediation sludge concentrations have not changed due to dilution from rinse water or supernatant. Due to the much higher contaminant concentrations observed in Tank V-9, and the lower mass of the tank itself, the acceptable residual sludge thickness is considerably smaller and not measurable by visual or other common industrial practices. However, visual observation of sludge remaining in the tank will be one indication that the tank is not LDR compliant.

After the tanks are rinsed and cleaned, a post-remediation evaluation will be conducted to support LDR-compliant disposal of the tanks in the ICDF. The evaluation will consider the amount of residual material in the tank, the estimated contaminant concentration of the residual material (with an upper

1. See additional discussion on tank cleanliness in 6.2.12.4.

bound being the current sludge concentrations), the amount of supernatant or clean water added during tank rinsing, and the tank weight.

If Tank V-9 cannot be shown to be LDR-compliant, then it will be rendered into debris by cutting large holes in the tank. In addition, the tank will be macroencapsulated prior to disposal at the ICDF. Figure F-1 in Appendix F shows an example of macroencapsulation for Tank V-9. Tanks V-1, V-2, and V-3 are too large to be easily macroencapsulated, therefore, the rinsing and sludge removal operation will continue until LDR compliance is achieved.

The key action for the visual inspection task is itemized below:

- Visually estimate the amount of sludge remaining in the bottom of the tank. Consideration should be given to the contents remaining both in the bottom of each tank as well as each tank's sump.

6.2.12.5 Phase 2 Soil Excavation. Phase 2 soil excavation involves excavating additional soil around the V-Tanks to enable their extraction. This will occur following waste removal from the tanks. Drawings C-4 through C-7 in Attachment 1 provide the excavation contours and sloping requirements.

Heavy equipment, such as a track hoe with an extendable boom, will be used to remove the bulk of the soil. A vacuum excavator, such as a Utilivac, may also be used to excavate near the tanks and pipes.

Excavated soil will be transported to the soil staging area for temporary storage as bulk material. If the soil does not meet radiological control criteria, it will be placed in large soil bags or roll-off containers, which will be stored in the soil storage area. With the approval of the ICDF contractor, the Field Engineer may elect to transport the soil directly to the ICDF.

The key actions for Phase 2 soil excavation task are itemized below:

- Use heavy equipment, e.g., track hoe or vacuum excavator, to remove soil around each V-Tank
- Use caution when excavating near pipes. Hand excavation may be necessary
- Bag soils as necessary, or place into roll-off containers, to meet radiological control criteria
- Transport excavated soil to the soil storage area or to the ICDF as directed by the Field Engineer.

6.2.12.6 Tank and Piping Removal. After excavating to expose most of the V-Tanks surfaces, the tanks will be rigged and lifted from the ground. Drawings C-12 through C-18 show the preferred rigging method. To place the rigging under the tanks, the vacuum excavator or other appropriate means will be used to burrow a hole under the tanks and the rigging will be pushed through the hole. As described in Section 4.3.2.4 the following alternate methods may be used to place the rigging.

If the rigging cannot be pushed under the tanks a "Processor" may be used to lift one end of the tank to allow slings to be slid under the tank. Long reach tools and hand excavation may also be used. Care will be exercised to ensure that the hoisting and rigging requirements are met, that the adjacent building foundations are not undermined, and that personnel are not located in any areas where they could be at risk from the operations. If additional excavation requires deviation from the 1.5:1 sloping requirements, then appropriate shoring will be used.

Another, but less desirable, option would involve the addition of pad-eyes welded to the top of the tanks. If used, this option would require additional engineering analysis to ensure the structural integrity of the welded fittings. Regardless of which option is used, the INEEL hoisting and rigging requirements

will be followed. Approval to proceed with alternate lifting options is granted through the normal INEEL work control process.

As each tank is removed its exterior surface will be cleaned to enable compliant packaging and transportation. Some options for exterior surface cleaning include wiping with rags, brushes, or brooms. Also, a rope may be wrapped around the lower half of the tank and moved laterally to scrape caked soil off of the tank. An operational procedure, work order, or other operational document will be developed to direct tank and piping removal.

The key action for the tank and piping removal task are itemized below:

- During removal of tank V-9 remove the remaining outlet piping from tank V-9
 - Cut cap and remove piping as indicated on drawings
 - If liquid is present in pipes, collect, store, and return to V-Tanks or Consolidation Tanks
 - Package removed piping for disposal
- Burrow a hole under each V-Tank using vacuum excavation or hand tools as necessary. Alternate methods may be used to provide access for rigging installation.
- Install rigging slings
- Lift each tank separately
- To the extent practicable, clean the exterior surface of each tank as it is being lifted from the excavated pit
- Wrap the tank with shrink wrap or other contamination-control material
- Place the tank in the designated tank staging area or directly onto a transport truck.

6.2.12.7 Miscellaneous Waste Transfer. The miscellaneous waste described in Section 4.3.13 will be transferred to a Consolidation Tank after V-Tank sludge transfer and rinsing operations are complete. The miscellaneous waste includes ARA-16 waste, OU 1-07B sludge, liquids from V-Tank lines, and returned V-Tank samples. ARA-16 waste will be transferred from a waste HIC. The other wastes will be consolidated and transferred from carboy or other container.

The key actions for the ARA-16 waste transfer task are itemized below:

- Connect the waste transfer system shown in Drawing 628814 to the TAN V-Tank Sludge Transfer system at the designated point upstream of Pump P-1
- Using a forklift or other appropriate means, move the ARA-16 Waste HIC into location.
- Install shielding as directed by rad-engineering
- Remove the lid from the HIC and replace with the assembly shown in 628814; secure the compression latches and retreat to a shielded area.
- Transfer the ARA-16 waste to the Consolidation Tanks.

- Rinse the inside of the ARA-16 Waste HIC
- Remove the HIC lid assembly.

Similar steps will be conducted for the other three miscellaneous waste streams. Detailed procedures or work orders will be written to further define the waste transfer tasks.

6.2.13 Phase 1 Treatment (Air Sparging)

Phase 1 Treatment using air sparging will begin after the first V-Tank contents are transferred to the Consolidation Tanks. Operators will introduce compressed air to the Consolidation Tanks using the air compressor. The nominal flow rate for the air delivery is 40 scfm. Each tank will be sparged individually, i.e., one tank at a time, for approximately 42 hours each.

S-GAC adsorption units are sized to capture all of the VOCs for the entire project; no S-GAC adsorption unit change out is anticipated, however, a contingent change-out procedure or work order will be developed. The S-GAC units have a colorimetric indicator that the operators will use to determine if breakthrough is approaching.

The key actions for the air sparging operation task are itemized below:

- Sparge the waste in each Consolidation Tank for at least 42 hours at ambient temperatures (no auxiliary heat added)
- Recirculate the sparged waste between the consolidation tanks
- Sample the sparged waste as described in Section 6.2.14 below.

The above air sparging activities will be addressed in operating procedures.

6.2.14 Confirmation of Noncharacteristic Determination

After the Phase 1 treatment, samples will be collected and analyzed. The purpose of this sampling and analysis is to confirm the waste is not characteristically hazardous, and determine if the waste meets the LDR treatment standards.

A logic diagram depicting the analytical evaluation process is provided in the FSP (ICP 2004h). As necessary, high-resolution techniques will be used for the TCLP analysis for VOCs and SVOCs. If analytical interferences remain, i.e., the results are inconclusive, then the samples will be sparged at elevated temperatures (e.g. held at a boiling temperature) and reanalyzed with high-resolution techniques. If the results are still inconclusive, the samples will be subject to laboratory-scale chemical oxidation and reanalyzed. This process will either confirm the noncharacteristic nature of the waste or lead the project to additional treatment steps.

When sparging is completed, the waste will be contained in two of the Consolidation Tanks. To enhance the representativeness of the waste samples, the waste will be thoroughly recirculated between the two Consolidation Tanks. Samples will be taken from the recirculation lines connecting the two tanks. A portion of those samples will be analyzed while the remaining portion will be archived; the archived portions will be used later, if necessary, for the elevated temperature sparging (e.g. held at a boiling temperature) or the chemical oxidation analyses. Additional details can be found in the Phase 1 treatment FSP (ICP 2004h)

A portion of the collected sample will be analyzed after sparging, lab-scale elevated temperature sparging, and lab-scale chemical oxidation to determine the level of treatment necessary to meet applicable LDR treatment standards. This information will be used to determine the need for and appropriate implementation of either elevated-temperature sparging or chemical oxidation during Phase 2 treatment.

Complete sampling and analysis details are provided in “Field Sampling Plan for TSF-09/18 V-Tanks Phase I Treatment” ([ICP, 2004h](#)).

6.2.15 Soil Confirmation Sampling and RCRA Closure Sampling

The V-Tank remediation project is subject to two similar sets of complimentary sampling requirements. The CERCLA Field Sampling Plan (ICP 2004a), submitted as a supporting document to this workplan, addresses the CERCLA requirement to perform post-remediation soil sampling at the bottom of the excavation to analyze for V-Tanks contaminants; this analysis is then used to support a risk analysis that supports a potential revision to the FRGs and a determination of the need for further actions.

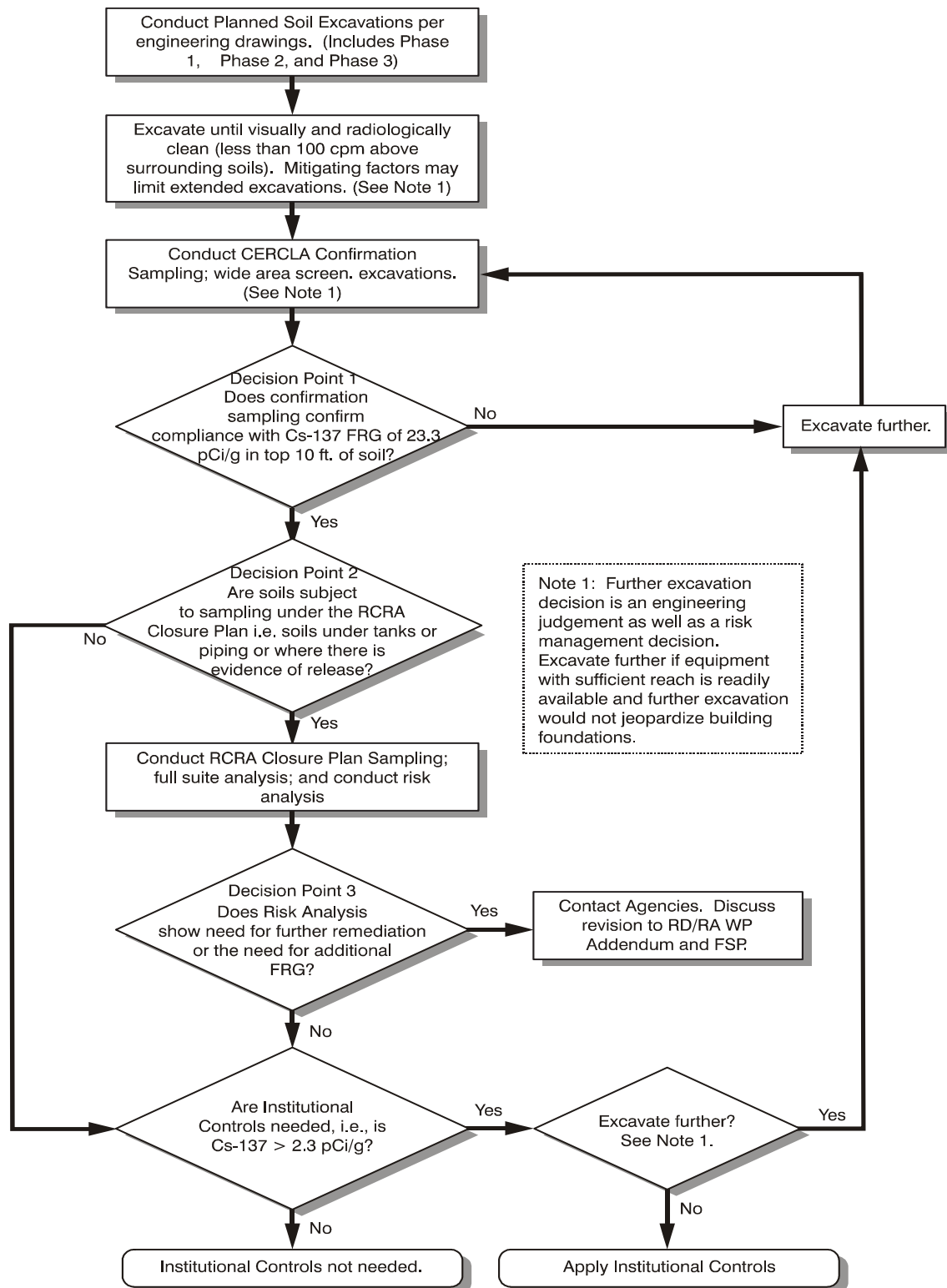
Complimentary to the CERCLA Field Sampling Plan is the RCRA Field Sampling Plan (INEEL 2003a), which supports the V-Tanks RCRA Closure Plan (DOE-ID 2004a). The RCRA Field Sampling Plan again requires sampling beneath the tanks and wherever else there is evidence of a release.

Both plans require the similar samples, laboratory analyses, and risk analysis. Because of the similarity between the two sampling plans, the CERCLA Field Sampling Plan has been designed to meet the requirements of the RCRA Field Sampling Plan. In order to avoid confusion in the field, no separate RCRA samples will be taken. Instead, completion of the CERCLA Field Sampling Plan activities will be used to comply with the RCRA requirements. The major difference between the two sampling plans is that the CERCLA Field Sampling Plan also requires confirmation sampling to demonstrate compliance with applicable FRG(s) and to determine the need for institutional controls.

The data collected as a result of this sampling approach will be used to confirm that the CERCLA-derived FRGs are protective with respect to HWMA/RCRA-regulated constituents^m to meet the goals of the RCRA Closure Plan and to meet the requirements of the OU 1-10 ROD Amendment. Using the data collected from CERCLA sampling events, a CERCLA risk analysis will be performed to determine if additional COCs need to be added to ensure that the final remediation meets the RAOs.ⁿ A risk-based screening approach will be used to guide the risk analysis (INEEL 2004b). Decision Point 3 in Figure 4 indicates that if additional contaminants are identified that require further remediation, then the Agencies will be consulted of the need to modify the remediation and sampling approach. Preliminary evaluation of previous RCRA sample data indicates that Cs-137 is likely to remain the only contaminant of concern and that new FRG(s) will not be necessary.

m. See Section 4.1.3 of the RCRA Closure Plan: “Soil samples beneath the collecting and sump tanks following removal of these components [the V-Tanks] (e.g. surface soils within the excavation footprint) and analyze for HWMA/RCRA COCs to confirm CERCLA-derived FRGs are protective with respect to HWMA/RCRA-regulated constituents.”

n. As stated in Section 2.1, a RAO is to reduce risk from all pathways and all COCs to a total excess cancer risk of less than 1 in 10,000 and a total hazard index of less than 1 for the hypothetical resident 100 years in the future and for the current and future worker.



G1199-18

Figure 4. Decision diagram for RCRA closure and confirmation sampling.

Upon completion of excavation efforts, confirmation sampling will be conducted through the use of wide-area gamma-screening of the soils. If areas with shine from nonremediation sources exist that prevents reliance on wide-area screening, puck samples may be used for confirmation samples. All radiological data will be used to address the following question:

- Does the soil remaining at the excavated area of concern meet the Cs-137 FRG of 23.3 pCi/g in the top ten feet of soil (Decision Point 1 in Figure 4).

Soil not meeting this FRG will be removed. Further excavation may be conducted to reduce the need to implement institutional controls. These further excavations may be limited by mitigating factors such as the reach of available excavation equipment. .

Table 3-1 in the CERCLA FSP summarizes the various samples that are planned for this combined CERCLA remedial action and RCRA Closure. Figure 4 provides the decision logic for the soil remediation and sampling process.

The key actions for the various sampling activities are itemized below:

- Conduct planned excavations to support tank removal with continuing excavations until site is visually and radiologically clean. (See Figure 4 for limits to excavation)
- Conduct CERCLA confirmation sampling in accordance with the FSP
- If necessary (see Figure 4, Decision Point 1), excavate additional soil
- If required (see Figure 4, Decision Point 2), conduct soil RCRA closure sampling for V-Tank constituents in accordance with the FSP (also meets RCRA Closure Plan and FSP requirements)
- Utilize RCRA Sampling data to conduct a CERCLA risk analysis to determine need for new FRGs and to demonstrate protectiveness with respect to HWMA/RCRA-regulated constituents
- If required (see Figure 4, Decision Point 3), review and determine need for further remediation with Agencies.

6.2.16 Phase 3 Soil Removal

Based upon previous sampling results and the sampling needed for RCRA Closure of the V-Tanks, excavation will continue as needed to remove all soils that are greater than 23.3 pCi/g of Cs-137 to a depth of 10 ft bgs. The same excavation equipment used for the previous excavation efforts will be used.

The Field Sampling Plan (ICP 2004a) and Figure 4 provide the logic for sampling and decision making regarding when to stop excavation. As detailed in the FSP, confirmation sampling will be based in part upon a wide-area screen that uses a 35 ft by 35 ft grid arrangement. Soil exceeding 23.3 pCi/g of Cs-137 (or with unacceptable concentrations of other FRG-contaminates) within those grids will be excavated until a depth of 10 ft is achieved. On the basis of engineering judgment and a risk-management decision, deeper excavation may be conducted if not limited by the available excavation equipment and if the excavation would not jeopardize building foundations.

The key actions for the Phase 3 soil excavation task are itemized below:

- Excavate soils as necessary to achieve FRGs
- Use wide-area screen to determine if the Cs-137 concentration is less than 23.3 pCi/g.

All soils excavated (Phases 1, 2, and 3) may be stored in the soil storage area shown in Drawing C-9. If the soil meets radiological control criteria, it may be stored as bulk soils. If the soil does not meet radiological control criteria, it will be placed into roll-off containers or large soil bags (approximately 8 × 8 × 5 ft).

6.2.17 Prefinal Inspection – Part 2

The purpose of Part 2 of the prefinal inspection is to ensure that the excavated areas meet FRGs prior to backfilling. The key action for the prefinal inspection Part 2 is:

- After confirmation sampling is completed, perform Part 2 of the prefinal inspection in accordance with Section 6.3.1.

6.2.18 Backfill

The area of contamination around the V-Tanks shown in Drawing C-2 will be backfilled with pit-run material from the TAN borrow pit, an area that has not been used for contamination-producing activities. Acceptable materials are described in SPC-555, Section 02200, which is provided in Attachment 2. Approximately 3,539 yd³ will be needed.

The excavated areas will remain open until confirmation soil sampling indicates successful compliance with the FRGs (see Figure 4, Decision Point 3). Due to analytical turnaround time and other scheduling factors the V-Tank excavation is expected to be backfilled in the spring of 2005.

The pit-run material will be backfilled in approximately 8-in. lifts and compacted with two to three passes by mechanical devices such as rollers, vibratory compactors, or mechanical tampers. The area will be regraded to promote drainage away from the area and away from adjacent buildings.

The key actions for the backfill task are itemized below:

- Backfill excavated areas in approximately 8-in. lifts, compacting between each lift.

6.2.19 Revegetation

No revegetation of the area around the V-Tanks will be done at this time because of anticipated demolition activities in the V-Tank area in the near future. In addition, heavy truck traffic to support activities associated with the TAN-607 Hot Shop would likely damage any revegetation efforts. Revegetation of the V-Tank area will be reconsidered upon completion of TAN-607 Hot Shop activities.

6.2.20 Waste Transport to ICDF

Waste generated during remedial activities will be transported to an appropriate waste disposal facility. As discussed in detail in the WMP (ICP 2004b), most of the waste generated will be sent to the ICDF. The empty V-Tanks will be externally cleaned to meet transportation requirements. The V-Tanks will be packaged to meet either Department of Transportation shipping requirements or the requirements specified in a transportation plan. It is anticipated that the V-Tanks will be wrapped in geotextile, or stretch plastic, or coated with a fixative material for transportation and transported intact to the ICDF. Furthermore, it is anticipated that the V-Tanks will contain miscellaneous debris and minor amounts of sludge that originated from previous V-Tank operations. Debris generated during the V-Tanks remediation will be packaged separately into standard waste boxes.

Upon receipt at the ICDF, the V-Tanks will be filled with grout or other inert material meeting the ICDF requirements. As discussed in Section 6.2.12.4, Tank V-9 may be macroencapsulated. All transportation arrangements will be coordinated with the INEEL Waste Generator Services Department and the Packaging and Transportation Department.

The key actions for the waste transportation task are itemized below:

- Ensure waste profiles are approved for all waste streams
- Ensure V-Tanks are externally cleaned and/or wrapped for transport
- Ensure appropriate and compliant transportation arrangements have been made for all waste streams
- Package all waste materials for transport to ICDF in accordance with applicable regulations and requirements
- Transport all waste materials to the ICDF or the approved off-Site disposal facility, as appropriate.

Transportation of the treated V-Tank waste to ICDF will be addressed in Revision 2 to this RD/RAWP Addendum 2 or in Addendum 3 (DOE/NE-ID 2004b)

6.2.21 Demobilization and Decontamination

Demobilization for the waste consolidation efforts involves disassembly of the sludge removal equipment and piping, characterizing it for disposal, and packaging for disposal. All equipment not needed for waste treatment will be removed and disposed of at the ICDF.

The key actions for the demobilization and decontamination task are itemized below:

- Decontaminate all equipment in accordance with the Decontamination Plan ([ICP 2004c](#))
- Disassemble waste transfer equipment^o and isolate consolidation tanks
- Dispose of waste material as discussed in Section 6.2.22 or excess equipment as appropriate
- Upon completion of this task, no waste transfer equipment shall remain at the V-Tank site.

Demobilization and decontamination of the waste treatment equipment, including the Consolidation Tanks, will be addressed in Revision 2 to this RD/RA Work Plan Addendum 2 or in Addendum 3, as appropriate.

6.2.22 Waste Management and Disposal

The remedial actions planned under this RD/RAWP Amendment for the V-Tanks will require disposition of various waste streams, which are identified in the WMP (ICP 2004b).

^o. Consolidation equipment in the all-weather enclosure and associated off-gas system will be disassembled and dispositioned after waste treatment.

A summary description of the WMP is provided in Section 6.5.3. The identified waste streams will be managed and stored in a designated CERCLA waste storage area until ultimate disposition in accordance with the WMP.

The waste will be treated, if necessary, and disposed of at an acceptable facility. Most of the waste is destined for the ICDF. Currently, it is anticipated that the only waste needing treatment will be the S-GAC adsorption units and the unstabilized, V-Tank waste. A more complete disposition decision on these items will be made when data from the post-sparge samples are received. Final disposition of these items will be addressed in Revision 2 to this RD/RAWP Addendum 2 or in Addendum 3, as appropriate. Table 4 of the WMP details the disposition requirements for each of the anticipated waste streams. Included in the table are estimated volumes and waste classifications.

In addition, the altered and unaltered samples collected as part of the Phase 1 treatment and waste characterization efforts will be returned to the Consolidation Tanks and combined with the other V-Tank waste. The addition of the returned sample material (potentially altered by addition of methylene chloride, which is already addressed as an F001 constituent) will not cause the addition of new treatment requirements. The potential volume of methylene chloride that is reasonably expected to be returned in the altered samples will not cause the final waste form to exceed existing F001 treatment standards for methylene chloride.

6.2.23 Site Access and Institutional Controls

Following remediation, the project will maintain site access and institutional controls. The following tasks will be performed.

- Reestablish site access and institutional controls based on the results of confirmation sampling
- Reinstall CERCLA/radiological area controls and signage, as necessary
- Reinstall institutional control area signage, as necessary
- Provide notice to Long-Term Stewardship that previously established institutional controls are to continue.

6.2.24 Records and As-Built

Following remediation, the project will ensure that accurate records are produced that clearly show the final physical conditions of the remediated site. The following tasks will be performed:

- Prepare final drawings showing extent of soil excavation for the TAN V-Tank AOC and adjacent areas, and the quantities of contaminated soil removed
- Prepare as-built drawings of the TAN V-Tank AOC site showing final underground site conditions (e.g., underground piping), as necessary, and surface contours
- File the drawings in accordance with standard INEEL document control protocols.

6.2.25 Prefinal Inspection – Part 3

After site backfill and recontouring is completed the following task will be performed:

- Conduct Part 3 of the prefinal inspection in accordance with Section 6.3.1.

6.3 Agency Inspections

Upon completion of remedial action activities for the V-Tanks site, prefinal and final inspections will be performed at the discretion of the Agency Project Managers or designees. Periodic inspections can occur at any time during remediation activities and will be conducted to finalize all project work elements. The inspections will establish compliance with the remedial design for the site and the remediation activities outlined in this RD/RAWP Addendum.

6.3.1 Prefinal Inspection

Prefinal inspections are performed by the Agencies or their designees, typically at the completion of the RA construction activities at a given site, to determine the status of those activities and to identify outstanding construction requirements and actions necessary to resolve any issues identified.

As indicated in Figure 5, the prefinal inspection for consolidation activities will be conducted in three parts: Part 1 prior to Phase 1 treatment (air sparging at ambient temperature), Part 2 prior to backfill of the tank excavation and Part 3 following completion of the site remediation.

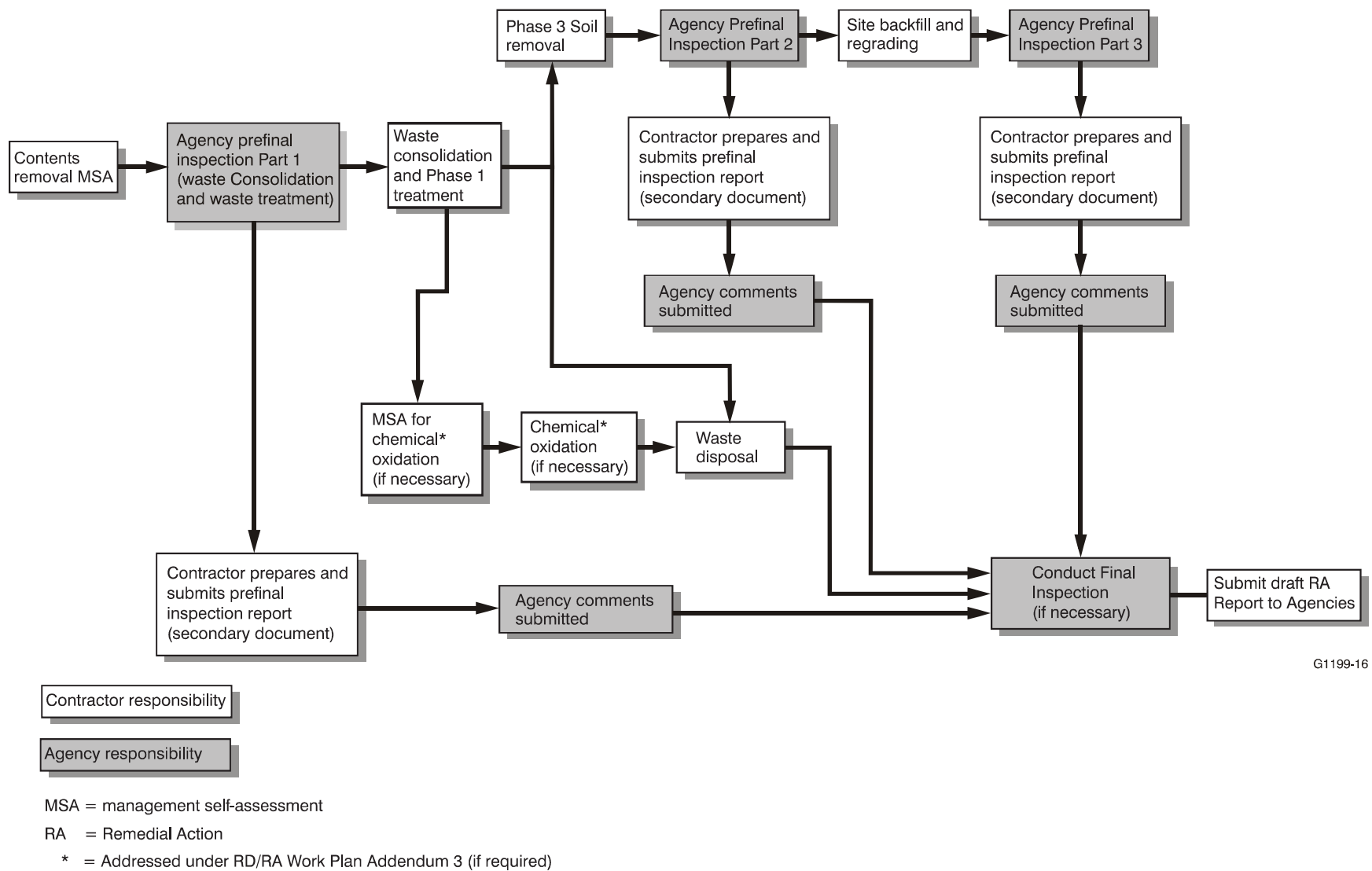
A prefinal inspection checklist will be developed for the prefinal inspections conducted at the site to document any unresolved or open items and the required actions for their resolution or completion. The checklists will contain specific project systems, components, start-up test procedures, or other areas agreed upon by the Agencies that will be inspected for acceptance of construction activities. The focus is on remedial action elements significant to meeting the requirements of the ROD. Backup sheets may be required to describe each item on the checklist and the criteria for acceptance/rejection of each item.

The Project will provide a draft prefinal inspection checklist to the Agencies for review and input with a review period of 15 calendar days. Following Agency review, the checklist will be finalized for use in conducting the prefinal inspection. DOE Idaho will notify the Agencies at least two weeks prior to the prefinal inspection date so the Agencies can make arrangements to conduct the inspection.

Results of the prefinal inspection will be documented in a prefinal inspection report, which will be issued as a DOE report and will contain the following elements:

- The names of all inspection participants.
- Specific project elements/hold points that were inspected.
- The completed prefinal inspection checklist documenting the performance of the inspection and all inspection findings.
- Open items identified during the inspections.
- Corrective actions to be taken to close open items or to correct deficiencies, acceptance criteria or standards, and planned dates for completion of the actions. A corrective action plan may be developed to address open items or deficiencies that cannot be closed during the prefinal inspection.
- Date of final inspection (if required).

The completed prefinal inspection checklist will be included as an appendix to the prefinal inspection report. The prefinal inspection report will not be revised, but rather will be finalized in the context of the remedial action report. The schedule for conducting the prefinal inspection and submitting the prefinal inspection report is included in the overall schedule for remedial action (see Section 6.1.4).



G1199-16

Figure 5. Simplified process flow diagram for prefinal inspection reports.

6.3.2 Final Inspection

A final inspection may be scheduled for, and conducted at, the completion of the remedial action. The Agency project managers will determine the need for a final inspection based on the results of the prefinal inspection. The final inspection will verify the closure of open items from the prefinal inspection and will confirm and document that the FRGs have been met. Results of the final inspection will be documented in the remedial action (RA) report.

6.4 Remedial Action Report

An RA report will be prepared to address the Group 2 V-Tanks site. The draft OU 1-10 Group 2 RA report, a primary document, will be submitted within 60 days after the final inspection for OU 1-10 Group 2 V-Tanks site.

The RA report will incorporate the results of the final inspection (or prefinal inspections if it is determined that a final inspection is not required) and will include:

- Identification of the work defined in this Group 2 RD/RAWP addendum, and the previous and subsequent addenda for the Group 2 site certification that the work was performed and that FRGs have been met, including:
 - Restatement of RAOs
 - Listing of all documents used in performing the remediation (i.e., RD/RAWP, Addenda, and supporting documents, work orders, environmental checklist, subcontracts, other project documents, etc.)
 - Summary of work performed to complete the remedial action
 - Summary of the sampling performed and the sampling data results that support completion of the remedial action
 - Summary of other data (i.e., land survey, etc.) that support completion of remedial action
 - Summary of contaminated soil design volumes and final volumes of contaminated soil disposed of at the ICDF
 - Summary of waste stream disposition (i.e., quantity generated and disposed, disposal location, etc.)
 - Certification of remediation completion (including reference to the HWMA/RCRA closure for the V-Tanks)
- Explanation of any modifications to the Group 2 RD/RAWP Addendum 1 and 2 documents, and (if produced) Addendum 3
- Any modifications made to the RD during implementation of the RAs, including the purpose of the performed modifications and the results of those modifications
- Problems encountered during implementation of the RAs and resolutions to those problems
- Any outstanding items from the prefinal inspection checklist with a description of how the outstanding items were closed

- Documentation of the results of the prefinal inspections
- An operations and maintenance plan update to address environmental monitoring and/or inspection of soil caps, if necessary
- Identification of changes to institutional controls based on remediation completion (to be incorporated into the *INEEL Sitewide Institutional Controls Plan* (DOE-ID 2004g))
- As-built drawings showing final contours, if necessary.

6.5 Supporting Documents

6.5.1 Field Sampling Plan for Soil Sampling

Two complementary field sampling plans apply to soil remediation for the V-Tank Remediation. One FSP addresses data collection for soils beneath the tanks and the piping upon tank removal and supports RCRA closure plan requirements (INEEL 2003a). A second FSP, which supports the CERCLA remediation, addresses the surface soils and guides the collection and analysis of samples that will provide data to support confirmation that the RAOs have been met. This second FSP (i.e., the CERCLA FSP [ICP 2004a]) specifically addresses characterization of soils *after* all visibly stained soils and soils with a radiological activity greater than 23.3 pCi/g of Cs-137 have been removed from the AOC. The CERCLA FSP will be implemented following excavation of the V-Tanks and other areas identified in Sections 4.3.2 of this RD/RAWP Addendum. The CERCLA FSP document is provided separately as a supporting document.

Figure 4 depicts the remedial action decision points that must be supported by data collected through the use of these two complimentary sampling events. For the soils beneath the tanks and piping, implementation of the RCRA Closure FSP (INEEL 2003a) calls for samples to be collected and analyzed for radionuclides, metals, anions, VOCs, SVOCs, and PCBs. The purpose of this FSP is to identify potential additional contaminants of concern that may affect achievement of the RAOs. The locations for these samples are the tank footprint and areas of known or suspected pipe leaks. Figure 1-2 in the CERCLA FSP shows the locations for both the RCRA and CERCLA samples.

For confirmation sampling, samples will be collected from the tank footprint, the former location of TSF-21, and several surface areas needing confirmation that the FRGs have been achieved. Table 3-2 in the CERCLA FSP lists all of the samples needed to support the RCRA Closure Plan and the CERCLA FRG confirmation.

6.5.2 Phase 1 Treatment Field Sampling Plan

A separate Field Sampling Plan ([ICP 2004h](#)) was written to address the collection and analysis of treated waste samples. This plan is being submitted as a supporting document to this RD/RAWP Addendum 2 (Revision 1).

The Phase 1 treatment FSP includes details regarding the number of samples to be collected, the analytical method to be used, and the data quality objectives. Notably, this plan calls for high-resolution analysis of the waste samples, if necessary.

6.5.3 Waste Management Plan

The Waste Management Plan (WMP) (ICP 2004b), which is a supporting document, describes the waste management and decontamination activities associated with the Group 2 Remedial Design/Remedial Action Work Plan. The WMP identifies the waste streams anticipated to be generated during implementation of the RA and details the strategies for waste characterization, minimization, storage, packaging, labeling and transportation, and disposal. The WMP identified approximately several waste streams that are generally variations of:

- PPE and sampling debris
- Sludge and liquid from the V-Tanks
- Tanks, and piping miscellaneous equipment
- Filters (HEPA and S-GAC)
- Soil
- Decontamination rinse water (if used)
- Nonradioactive industrial waste.

Revision 0 of the WMP addresses only the waste generated during consolidation and most of the waste generated during Phase 1 waste treatment (air sparging at ambient temperature) efforts covered by this RD/RA Work Plan (Addendum 2, Rev 1). Waste treated by air sparging at elevated temperatures or, if necessary, chemical oxidation, will be solidified or stabilized and disposed at the ICDF. If air sparging at ambient temperature is successful, disposition of the waste will be addressed in Revision 2 to this RD/RAWP Addendum 2 and a revision to the WMP (ICP 2004b). If air sparging at elevated temperatures or chemical oxidation is necessary, disposition of the treated waste will be addressed in the RD/RAWP Addendum 3 and a revision to the WMP.

6.5.4 Decontamination Plan

The Project Decontamination Plan (ICP 2004c) specifies the methods and techniques to be used to decontaminate personnel and equipment used during remediation activities at the TSF-09/18 V-Tanks Site. The decontamination plan is a supporting document that has been submitted to the Agencies separately.

Because of the mixed-waste classification of V-Tanks content, decontamination activities will be required for both RCRA and radiological contamination. However, due to the nature of the contamination source material at the V-Tanks, radiological contamination will serve as the leading indicator for detecting both radiological and nonradiological surface contamination; nonradiological contamination is not expected to be present without some detectable radiological contaminants.

Prior to completing the remediation activities, all equipment and tools of significant value that were in contact with contaminated media will be decontaminated for future use. The contents of the V-Tanks are F001 listed hazardous and radioactive waste and the ARA-16 waste is F005-listed. Therefore, the RCRA objective of decontaminating contaminated equipment is to meet the RCRA treatment standards for hazardous debris and to allow them to be reused.

The radiological objective of decontaminating the ancillary equipment used to remediate the V-Tanks is to achieve free release of the equipment for unrestricted use elsewhere.

6.5.5 Health and Safety Plan

The site-specific HASP ([ICP 2004d](#)) has been prepared to provide safety guidance for the personnel working at each remediation site. The HASP addresses the following areas of concern:

- Task-site responsibility
- Personnel training
- Occupational medical program and medical surveillance
- Safe work practices
- Site control and security
- Hazard evaluation
- Personal protective equipment
- Personnel decontamination and radiation control
- Personnel monitoring
- Emergency response for the project sites.

Monitoring of the off-gas for VOCs will be conducted downstream of the S-GAC adsorption units as part of the routine industrial hygiene monitoring.

Safe work documents, such as radiation work permits and job safety analyses, will be developed in accordance with existing INEEL procedures and systems to implement the requirements of the HASP. They will be modified, supplemented, or generated (as necessary) during the work activities to address changing conditions or revisions to the work methods described in the planning documents. The HASP is a working document and will be reviewed and modified accordingly as the project planning documents are developed and finalized.

6.5.6 Institutional Control Plan

Institutional controls were previously implemented at the TSF-09/18 V-Tanks site in accordance with the *Institutional Control Plan for the Test Area North Waste Area Group 1* (INEEL 2000). Current institutional controls are not expected to change after the remediation of the V-Tanks.

The WAG 1 Institutional Control plan will be superseded by the *INEEL Sitewide Institutional Controls Plan* (DOE-ID 2004g) when the Sitewide plan is approved by the Agencies and issued. Upon completion of a remedial action, necessary changes to the institutional controls will be incorporated into the *INEEL Sitewide Institutional Controls Plan* (DOE-ID 2004g).

6.5.7 Operations and Maintenance Plan

Operations and maintenance activities for the TAN V-Tanks site is covered in the *Operations and Maintenance Plan for the Test Area North, Operable Unit 1-10* (DOE-ID 2001). This plan focuses on the

post remediation operation and maintenance needed to address concerns regarding intrusion, subsidence, and erosion. Due to the short duration of the remedial action, operations and maintenance activities for the consolidation system will be addressed through normal INEEL work control process as needed.

A revision to the O&M plan is being made to address the expected changes in O&M requirements following completion of remediation of these sites. This revision to the O&M plan will include requirements for inspection to ensure that noxious weeds are not prevalent. These changes, if necessary, will be reviewed by the Agency PMs and implemented. The O&M plan will be revised further, if necessary, following completion of remediation based on the outcome of the remediation.

6.5.8 Spill Prevention and Response Program

A separate spill prevention and response plan is not necessary to implement the RAs. Any inadvertent spill or release of potentially hazardous materials will be addressed in EAR-17, "Hazardous Substance/Waste Spill Control, TAN Operating and Maintenance Procedures" (EAR-17 2004). In the event of a spill, the emergency response plan contained in EAR-17 will be activated. All materials and substances on the work site will be stored and handled in accordance with the applicable regulations and will be stored in approved containers.

6.5.9 Work Planning Documentation

The work control documents are based on the requirements established in this RD/RAWP addendum and facilitates preparation of the project-specific HASP, and work authorization documents. The strategies for implementing the remedy are discussed, as are the resources needed and the procedures and protocols to be followed. As internal contractor documents, the work planning documentation is not submitted to the Agencies for review.

6.5.10 HWMA/RCRA Closure Plan and Associated Field Sampling Plan

The HWMA/RCRA Closure Plan (DOE-ID 2004a) outlines criteria necessary to insure RCRA regulated constituents are being adequately addressed under the CERCLA closure activity. The HWMA/RCRA closure plan specifies sampling necessary to ensure that FRGs for the site adequately address HWMA/RCRA contaminants of concern. The associated RCRA Field Sampling Plan (INEEL 2003a) implements the sampling required by the HWMA/RCRA closure plan. As a matter of convenience, the specific sampling locations, target analytes, and other requirements from the RCRA Field Sampling Plan are incorporated into the CERCLA Field Sampling Plan (ICP 2004a).

6.5.11 Risk-Based Screening and Assessment Approach for Waste Area Group 1 Soils

The risk-based screening and assessment approach for WAG 1 soils (INEEL 2004b) provides a process to evaluate selected existing and new soil contamination sites at TAN to determine if contaminant risk drivers may be present in addition to Cs-137. This screening and assessment will use the data collected from the aforementioned RCRA Field Sampling Plan (INEEL 2003a). Current data indicates that Cs-137 is likely to be the only contaminant that drives the FRGs (ICP 2004e).

Results of the screening and analysis, will be provided to the Agencies informally on a conference call and formally in a risk-based analysis report.

7. CHANGES TO REMEDIAL DESIGN/REMEDIAL ACTION DOCUMENTS

7.1 Changes to OU 1-10 V-Tanks RD/RA Scope of Work

The V-Tanks RD/RA Scope of Work (DOE-ID 2004h) called for air sparging followed by chemical oxidation/reduction of the tank contents. As described in Section 1.3, during design of the air sparging, further analysis revealed that air sparging alone has the potential to achieve the required waste treatment standards without the need for chemical oxidation.

The RD/RA Statement of Work also described Addendum 3 as the planning document that would address waste treatment by chemical oxidation. However, the need for Addendum 3 may be eliminated if air sparging at ambient temperature achieves the desired treatment standards. If air sparging at ambient temperature is successful, Addendum 3 will not be written but Addendum 2 will be further revised to include appropriate measures for final waste stabilization and disposal.

7.2 Control of Changes to RD/RAWP Addenda

The need for changes to this RD/RAWP addendum and supporting documents (RD/RA documents) will inevitably arise during the implementation of the remedial action. Identification and rapid resolution of issues and disposition of changes is critical to successful project implementation under the accelerated schedule for remedial action. To support the accelerated implementation of the remedial action the following protocol is established to cover resolution of issues and disposition of proposed changes:

- All significant issues and proposed major changes will be brought to the attention of the Agencies via periodic conference calls and/or status meetings. Items of significant importance may be addressed in impromptu conference calls and/or meetings.
- The significance of proposed changes will be assessed and determined as minor or major. In addition, major changes will be assessed to determine if they may affect the requirements of the OU 1-10 ROD or ROD Amendment and be either significant or fundamental as defined in EPA guidance, *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and other Remedy Selection Decision Documents* (EPA 1999).
- Changes that are determined to be significant or fundamental will be addressed per the FFA/CO established protocol.
- Major changes will be defined as changes that have a substantive affect on the RD/RA documents in terms of how the remedy is designed or the remedial action implemented. Minor changes are those changes that do not have a substantive affect.
- Proposed major changes will be provided to the Agencies for review.
- Agency agreement on how to resolve issues and/or disposition proposed major changes will be recorded in the conference call minutes or will be documented by email.
- The INEEL change control procedures will be used to implement both major and minor changes. Agency concurrence on major changes will be noted on the change control documentation.

- Subsequent revisions to RD/RA documents to incorporate the changes will note that Agency concurrence on the major changes was previously obtained and reference the conference call minutes or email where the concurrence was documented.
- Change control documents and revisions to RD/RA documents will be subsequently transmitted to the Agencies.

8. FIVE-YEAR REVIEWS

In accordance with the *National Oil and Hazardous Substances Pollution Contingency Plan* (EPA 1992) for sites where contamination is left in place above health-based levels, a review will be conducted within five years from the initiation of construction activities at OU 1-10 to ensure that the remedy and institutional controls are still effective in protecting human health and the environment. Under the amended remedy, the contamination in the V-Tanks contents will be removed from the V-Tanks site. However, pursuant to the original remedy, contaminants in the surrounding soil may remain on the INEEL during the remedial action above levels that allow for unlimited use and unrestricted exposure. Therefore, a statutory review will be conducted within 5 years after initiation of remedial action, and at least every 5 years thereafter through the standard CERCLA 5-year review process. The reviews will be used to assess the need for future long-term environmental monitoring and administrative/institutional controls. In addition, the five-year review will include inspection for the presence of noxious weeds and, if necessary, their removal. Five-year reviews will be conducted for the remediated site with institutional controls until 2099 (i.e., until the 100-year institutional control period expires) or until it is determined that the site no longer poses a risk to human health or the environment. This provision does not preclude more frequent reviews by one or more of the Agencies.

A schedule date for the first OU 1-10 five-year review was provided in Section 8 of the original Group 3 RD/RAWP ([DOE-ID 2003c](#)). However, based on Agency agreement, the submittal date for the draft five-year review report is changed from February 28, 2005, to June 30, 2005. This submittal date change will allow the first five-year review for OU 1-10 to be performed as part of the INEEL sitewide review and be documented in the INEEL sitewide five-year review report. The five-year review for OU 1-10 will be performed in accordance with the *Idaho National Engineering Environmental Laboratory Sitewide Five-Year Review Plan for CERCLA Response Actions* (DOE/NE-ID 2004b).

9. REFERENCES

- 10 CFR 830, Subpart A, 2002, "Quality Assurance Requirements," *Code of Federal Regulations*, Office of the Federal Register, February 2002.
- 29 CFR 1910, "Occupational Safety and Health Standards," *Code of Federal Regulations*, Office of the Federal Register, March 2004.
- 29 CFR 1926, "Safety and Health Regulations for Construction," *Code of Federal Regulations*, Office of the Federal Register, December 2002.
- 29 CFR 1926.652(b), 2002, "Requirements for Protective Systems – Design of Sloping and Benching Systems," *Code of Federal Regulations*, Office of the Federal Register, December 2002.
- 40 CFR 264 Subpart C, 2004, "Pre-Transport Requirements," *Code of Federal Regulations*, Office of the Federal Register, March 2004.

- 40 CFR 264 Subpart J, 2004, “University Laboratories XL Project-Laboratory Environmental Management Standard,” *Code of Federal Regulations*, Office of the Federal Register, March 2004.
- 40 CFR 264.192, 2004, “General Operating Requirements,” *Code of Federal Regulations*, Office of the Federal Register, April 20, 2004.
- 40 CFR 268, 2004, “Land Disposal Restrictions,” *Code of Federal Regulations*, Office of the Federal Register, March 29, 2004.
- 40 CFR 300, 2004, “National Oil and Hazardous Substances Pollution Contingency Plan,” *Code of Federal Regulations*, Office of the Federal Register, March 2004.
- 40 CFR 761.61(c), 2003, “PCB Remediation Waste – Risk-Based Disposal Approval,” *Code of Federal Regulations*, Office of the Federal Register, June 2003.
- 40 CFR 761.65, 2003, “Storage for Disposal,” *Code of Federal Regulations*, Office of the Federal Register, June 20, 2003.
- 15 USC 2601 et seq., 1976, “Toxic Substances Control Act,” as amended.
- 42 USC 2210 et seq., 1988, “Indemnification and Limitation of Liability (Price-Anderson Act).”
- 42 USC 6901 et seq., 1976, “Resource Conservation and Recovery Act of 1976 (Solid Waste Disposal Act),” *United States Code*, October 21, 1976.
- 42 USC 9601 et seq., 1980, “Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA/Superfund),” *United States Code*, December 11, 1980.
- 55 FR 46, 1990, “National Oil and Hazardous Substances Contingency Plan,” *Federal Register*, Environmental Protection Agency, pp. 8665-8865, March 8, 1990.
- AASHTO M-145-91, 2000, “Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes,” American Association of State Highway and Transportation Officials, 2000.
- ANSI 6.4.2-1985, “Specification for Radiation Shielding Materials,” American National Standards Institute, January 1985.
- ANSI C2-2002, “National Electrical Safety Code,” American National Standards Institute, January 2002.
- APAD 04-53, 2004, “Air Permitting Applicability Determination,” TAN V-Tanks, September 9, 2004.
- ASME AG-1, 2003, “Code on Nuclear Air and Gas Treatment,” American Society of Mechanical Engineers, August 2003.
- ASME B16, “Fittings, Flanges, and Valves” American Society of Mechanical Engineers.
- ASME B31.3- 2002, “Process Piping,” American Society of Mechanical Engineers, (Fluid Category “M”), February 14, 2002.
- ASME Boiler and Pressure Vessel Code, Section VIII.

Blackmore, C. S., INEEL, to J. T. Taylor, INEEL, Idaho Falls, March 10, 1998, “Criticality Safety Issues Associated with the TAN V-Tanks,” CSB-004-98.

DOE O 231.1A, 2004, “Environment, Safety and Health Reporting,” U.S. Department of Energy, Change 1, June 3, 2004.

DOE O 414.1B, 2004, “Quality Assurance,” U.S. Department of Energy, April 29, 2004.

DOE O 435.1, 2001, “Radioactive Waste Management,” U.S. Department of Energy, Change 1, August 28, 2001.

DOE O 470.1, 1995, “Safeguards and Security Program,” U.S. Department of Energy, Change 1, September 28, 1995.

DOE O 5400.5, 1993, Chapter II (1)(a, b), “DOE Public Dose Limit—All Exposure Modes, All DOE Sources of Radiation,” and “Airborne Emissions Only—All DOE Sources of Radionuclides,” U.S. Department of Energy, January 1993.

DOE O 5400.5, 1993, “Radiation Protection of the Public and the Environment,” Change 2, U.S. Department of Energy, January 1993.

DOE O 5480.4, 1993, “Environmental Protection, Safety, and Health Standards,” U.S. Department of Energy, Change 4, January 7, 1993.

DOE-ID, 1991, *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory*, Administrative Docket No. 1088-06-120, U.S. Department of Energy Idaho Operations Office; U.S. Environmental Protection Agency, Region 10; Idaho Department of Health and Welfare, December 9, 1991.

DOE-ID, 1994, *Remedial Design and Remedial Action Guidance for the Idaho National Engineering Laboratory*, DOE/ID-12584-152, Rev. 2, Morrison Knudsen-Ferguson of Idaho Company, September 1994.

DOE-ID, 1997, *Comprehensive Remedial Investigation/Feasibility Study for the Test Area North Operable Unit 1-10 at the Idaho National Engineering and Environmental Laboratory*, DOE/ID 10557, Rev. 0, November 1997.

DOE-ID, 1999, *Final Record of Decision for Test Area North, Operable Unit 1-10*, DOE/ID-10682, Rev. 0, U.S. Department of Energy Idaho Operations Office; U.S. Environmental Protection Agency, Region 10; Idaho Division of Environmental Quality, October 1999.

DOE-ID, 2000a, *Field Sampling Plan for the V-Tanks, TSF-09/18, at Waste Area Group 1, Operable Unit 1-10 Remedial Action*, DOE/ID-10794, Rev. 0, November 2000.

DOE-ID, 2000b, *Record of Decision for Power Burst Facility Auxiliary Reactor Area and Auxiliary Reactor Area, Operable Unit 5-12*, DOE/ID-10700, U.S. Department of Energy Idaho Operations Office; U.S. Environmental Protection Agency, Region 10; Idaho Division of Environmental Quality, January 2000.

DOE-ID, 2001, *Operations and Maintenance Plan for Test Area North, Operable Unit 1-10*, DOE/ID-10711, Rev. 1, November 2001.

DOE-ID, 2002, *Comprehensive Remedial Design/Remedial Action Work Plan for the Test Area North, Waste Area Group 1, Operable Unit 1-10, Group 2 Sites*, DOE/ID-10875, Rev. 1, March 2002.

DOE-ID, 2003a, *Explanation Of Significant Differences for the Record Of Decision for Test Area North Operable Unit 1-10*, DOE/ID-11050, Rev. 0, U.S. Department of Energy Idaho Operations Office; U.S. Environmental Protection Agency, Region 10; Idaho Division of Environmental Quality, April 2003.

DOE-ID, 2003b, *Comprehensive Remedial Design/Remedial Action Work Plan Addendum for V-Tanks Early Remedial Action for the Test Area North, Waste Area Group 1, Operable Unit 1-10, Group 2 Sites*, DOE/ID-11075, Rev. 0, May 2003.

DOE-ID, 2003c, *Remedial Design/Remedial Action Work Plan for Group 3, PM-2A Tanks and Burn Pits for Test Area North, Waste Area Group 1, Operable Unit 1-10*, DOE/ID-11073, Rev. 0, December 2003.

DOE-ID, 2004a, *Hazardous Waste Management Act/Resource Conservation and Recovery Act Closure Plan for the Test Area North/Technical Support Facility Intermediate-Level Radioactive Waste Management System Phase 2: Feed Subsystem (V-Tanks)*, DOE/ID-11053, Rev. 3, July 2004.

DOE-ID, 2004b, *Record of Decision Amendment for the V-Tanks (TSF-09 and TSF-18) and Explanation of Significant Differences for the PM-2A Tanks (TSF-26) and TSF-06, Area 10, at Test Area North, Operable Unit 1-10*, DOE/ID-10682 Amend, Rev. 0, U.S. Department of Energy Idaho Operations Office; U.S. Environmental Protection Agency, Region 10; Idaho Division of Environmental Quality, February 2004.

DOE-ID, 2004c *Field Sampling Plan for V-Tanks Early Remedial Action at Waste Area Group 1, Operable Unit 1-10*, DOE/ID-11065, Rev. 1, March 2004. (Suspended)

DOE-ID, 2004d, *Waste Acceptance Criteria for ICDF Landfill*, DOE/ID-10865, Rev. 7, August 2004.

DOE-ID, 2004e, *Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10, and Deactivation, Decontamination, and Decommissioning*, DOE/ID-10587, Rev. 8, March 2004.

DOE-ID, 2004f, *Idaho National Engineering Environmental Laboratory Waste Acceptance Criteria*, DOE/ID-10381, Rev. 20, June 2004.

DOE-ID, 2004g, *INEEL Sitewide Institutional Controls Plan*, DOE/ID-11042, Rev. 1, June 2004.

DOE-ID, 2004h, *Remedial Design/Remedial Action Scope of Work for the V-Tanks (TSF-09 and TSF-18) at Test Area North, Waste Area Group 1, Operable Unit 1-10*, DOE/ID-11119, Rev. 0, September 2004.

DOE-ID, 2004i, *Explanation of Significant Differences for the Record of Decision for the Power Burst Facility and Auxiliary Reactor Area Operable Unit 5-12*, DOE/ID-11017, Rev. 0, November 2004.

DOE/NE-ID, 2004a, "Group 2 Remedial Design/Remedial Action Work Plan Addendum 3 for TSF-09/18 V-Tank Contents Treatment for Test Area North, Waste Area Group 1, Operable Unit 1-10 (Draft)", DOE/NE-ID-11165, Rev. Draft, Date pending, 2004. (Note, this document may be cancelled if chemical oxidation is not necessary.)

DOE/NE-ID, 2004b, *Idaho National Engineering and Environmental Laboratory Sitewide Five-Year Review Plan for CERCLA Response Actions*, DOE/NE-ID-11125, Rev. 1, June 2004.

DOE/NE-ID, 2004c, *Explanation of Significant Differences For the Record of Decision for the Test Area North Operable Unit 1-10*, DOE/NE-ID-11199, Rev. 0, November, 2004.

DOE-STD-1090-2004, DOE Standard, “Hoisting and Rigging,” U.S. Department of Energy, June 2004.

DOE-STD-3020-97, 1997, “Specification for HEPA Filters used by DOE Contractors,” U.S. Department of Energy, January 1997.

EAR-17, 2004, “Hazardous Substance/Waste Spill Control,” EAR-17, January 2004.

EDF-3067, 2004, “Evaluation of TSF-09 V-Tanks Liquid Level Readings,” Rev.0, December 2001.

EDF-3077, 2004, “Risk-Based Approach For Management Of PCB Remediation Waste From V-Tanks,” Rev. 1, November 2004.

EDF-3477, 2003, “Criticality Concerns Associated with the TAN V-Tanks,” Rev. 0, April 2003.

EDF-4602, 2004, “TSF-09/18 V-Tank Contents Removal and Site Remediation,” Rev. 1, September 2004.

EDF-4604, 2004, “Shielding and Exposure Calculations for V-Tank Waste Process Activities,” Rev. 1, September 2004.

EDF-4672, 2004, “TSF-09/18 V-Tank Contents Removal and Site Remediation – Sitework Design,” Rev 0, September 2004.

EDF-4751, 2004, “V-Tanks Contents Remediation Mechanical Design,” Rev. 0, September 2004.

EDF-4885, 2004, “Reevaluation of Characteristic Toxicity Designation for V-Tank Waste, using Existing Sample Data,” Rev.1, August 9, 2004.

EDF-4928, 2004, “Potential Feed Streams for Inclusion into V-Tank Treatment Process,” Rev. 0, September 2004.

EDF-4956, 2004, “Off-Gas System, Sparge, TSF-09/18 V-Tank Contents Removal and Site Remediation,” Rev. 0, September 2004.

EDF-4977, 2004, “Hazard Assessment Calculation for TAN V-Tanks (V-1, V-2, V-3, and V-9)” Rev. Draft, September 2004.

EDF-5017, 2004, “Secondary Containment and Support Skid Design for V-Tank Consolidation Tanks,” Rev. 0, September 2004.

EDF-5196, 2004, “Supporting Calculations for APAD 04-53 TAN V-Tanks Remediation TSF-09/18,” Rev. 0, September 2004.

EDF-5347, 2004, “Criticality Safety Evaluation for the Treatment of the TAN V-Tanks” Rev. Draft, date pending, 2004.

- EPA, 1988, *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*, EPA/540/G-89/004, OSWER Directive 9355.3-01, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, October 1988.
- EPA, 1992, *National Oil and Hazardous Substances Pollution Contingency Plan (The NCP)*, EPA540-Z-00-001, Publication 9200.2-14, U. S. Environmental Protection Agency, Office of Emergency and Remedial Response, January 1992 (currently available at 40 CFR 300).
- EPA, 1999, *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and other Remedy Selection Decision Documents*, EPA 540-R-98-031, OSWER 9200.1-23P, U.S. Environmental Protection Agency, July 1999.
- GDE-67, 2003, "Hoisting and Rigging Standard Interpretation Guide," Rev. 2, *Manual 7 – Project and Construction Management*, May 2003.
- HAD-305, 2004, "Hazard Assessment Document for TAN V-Tanks (V-1, V-2, V-3, and V-9)," Rev. Draft, September 2004.
- Hain, K. E., DOE-ID, to W. Pierre, EPA, Region 10, and D. Nygard, Idaho Department of Health and Welfare, November 3, 1998, "Transmittal of Analytical Results and Limitations and Validation Reports for WAG 1 Surface Soil Sampling at the V-Tank and PM-2A Tank Sites," OPE-ER-169-98.
- ICP, 2004a, *Field Sampling Plan for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10*, ICP/EXT-04-00289, Rev. 0, Idaho Completion Project, November 2004.
- ICP, 2004b, *Waste Management Plan for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10*, ICP/EXT-04-00270, Rev. 0, Idaho Completion Project, November 2004.
- ICP, 2004c, *Decontamination Plan for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10*, ICP/EXT-04-00428, Rev 0," Idaho Completion Project, November 2004.
- ICP, 2004d, *Health and Safety Plan for the V-Tank Area CERCLA Site Remediation at Test Area North, Waste Area Group 1, Operable Unit 1-10*, ICP/EXT-04-00429, Rev 1, Idaho Completion Project, November 2004.
- ICP, 2004e, *V-Tanks TSF-09/18 Calendar Year 2003/2004 Early Remedial Action Activities Summary Report for Waste Area Group 1, Operable Unit 1-10*, ICP/EXT-03-00080, Rev. 0, Idaho Completion Project, August, 2004.
- ICP, 2004f, *Cold Bench-Scale Final Test Report for Chemical Oxidation/Stabilization of Surrogate V-Tank Waste at WAG 1, OU 1-10*, ICP/EXT-03-00019, Rev 0, Idaho Completion Project, April 2004.
- ICP, 2004g, "V-Tank Closure: Report on V-Tank Mock-up Testing," ICP/EXT-04-00649, Rev. Draft, Idaho Completion Project, Date pending, 2004.

ICP, 2004h, "Field Sampling Plan for TSF-09/18 V-Tanks Phase I Treatment (ESP-122-04)," ICP/EXT-04-00659, Rev. Draft, Idaho Completion Project, Date pending, 2004.

Idaho Statute, Title 39, *Health and Safety*, Chapter 44, "1983 Hazardous Waste Management Act," 1983.

INEEL, 2000, *Institutional Control Plan for the Test Area North Waste Area Group 1*, INEEL/EXT-2000-00917, Rev. 0, September 2000.

INEEL, 2001, *Voluntary Consent Order NEW-TAN-008 System Identification, TAN-616 Liquid Waste Treatment System*, INEEL/EXT-2000-01263, Rev. 1, June 2001.

INEEL 2003a, *Field Sampling Plan for the HWMA/RCRA Closure of the TAN/TSF Intermediate Level Radioactive Waste Feed Subsystem (V-Tanks)*, INEEL/EXT-02-01465, Rev. 0, May 2003.

INEEL, 2003b, *Conceptual Design Report for Ex Situ Chemical Oxidation/Reduction and Stabilization of the V-Tanks at Waste Area Group 1 Operable Unit 1-10*, INEEL/EXT-03-00438, Rev. 0, June 2003.

INEEL, 2004a, *INEEL Welding Manual*, Rev. 6.2, February 2004, *Welding Home Page*, <http://webhome4/weldcert/>.

INEEL, 2004b, *Risk-Based Screening and Assessment Approach for Waste Area Group 1 Soils*, INEEL/EXT-03-00540, Rev. 0, May 2004.

INEL, 1994, *Preliminary Scoping Track 2 Summary Report for the Test Area North Operable Unit 1-05: Radioactive Contamination Sites*, Idaho National Engineering Laboratory, INEL-94/0135, Rev. 0, October 1994.

MCP-540, 2004, "Documenting the Safety Category Of Structures, Systems, and Components," Rev. 14, *Manual 10A-Engineering and Research*, June 2004.

MCP-1126, 2004, "Performing Management Self-Assessments for Readiness," Rev. 2, *Manual 9-Operations*, July 2004.

MCP-3056, 2002, "Test Control," Rev. 3, *Manual 10A-Engineering and Research*, October 2002.

NFPA 70, 2004, "National Electrical Code," 2005 Edition, National Fire Protection Association, effective August 5, 2004.

NFPA 101, 2003, "Life Safety Code," 2003 Edition, National Fire Protection Association, effective August 14, 2003.

Sherwood, J. A., INEEL, to K. E. Hain, DOE Idaho Operations Office, May 29, 2003, "Transmittal of Auxiliary Reactor Area-16 Radionuclide Tank Waste Source Term Calculations," CNN 42770.

SPC-555, 2004, "Construction Specification TSF-09/18 V-Tank Remediation," Rev. 0, August 2004.

TAN-99-008, "Environmental Checklist, Test Area North, Operable Unit 1-10, WAG 1," Idaho National Engineering and Environmental Laboratory, as revised.

TFR-278, 2004, "Technical and Functional Requirements for Tank/Contents Removal and Site Remediation of V-Tanks TSF-09 and TSF-18 Operable Unit 1-10," Rev. 2, Idaho Completion Project, June 2004.

TPR-5054, 2002, "HEPA Filter In-Place Testing," Rev. 2, Idaho National Engineering and Environmental Laboratory, October 2002.

Appendix A

Applicable or Relevant and Appropriate Requirements Implementation

Table A-1. Summary of ARARs compliance strategy for V-Tank amended remedy.

Requirement (Citation)	Comment	Relevancy ^a	Compliance Strategy
<p>IDAPA 58.01.01.161 (formerly IDAPA 16.01.01.161), Toxic Substances</p> <p>IDAPA 58.01.01.585 (formerly IDAPA 16.01.01.585), Toxic Air Pollutants, Non-Carcinogenic Increments</p> <p>IDAPA 58.01.01.586 (formerly IDAPA 16.01.01.586), Toxic Air Pollutants, Carcinogenic Increments</p>	<p>Applies to air emissions during excavation of soils and during removal and treatment of waste.</p> <p>The release of carcinogenic and noncarcinogenic contaminants into the air must be estimated before start of construction, controlled, if necessary, and monitored during excavation of soil, removal of the waste and tank system, and decontamination of the tanks and piping.</p>	A	<p>Releases of carcinogenic and noncarcinogenic contaminants into the air from Phase 1 treatment are addressed in Attachment 4 in which modeling indicates under worst case scenarios that chemical and radionuclide concentrations will be below the IDAPA air quality limits, National Emission Standards for Hazardous Air Pollutants (NESHAP) limits for radionuclides, or Occupational Safety and Health Act (OSHA) permissible exposure limits. Air emissions will be monitored during excavation as determined appropriate by a certified industrial hygienist and a radiological control engineer. Dust suppression measures will be used, as indicated in the Health and Safety Plan.^b</p>
IDAPA 58.01.01.591 (formerly IDAPA 16.01.01.591), National Emission Standards for Hazardous Air Pollutants, and the following as cited in it:			
<p>40 CFR 61.92, National Emission Standards for Hazardous Air Pollutants</p> <p>40 CFR 61.93, NESHAPS Emission Monitoring and Test Procedures</p> <p>40 CFR 61.94(a), NESHAPs Emissions Compliance</p>	<p>Applies to air emissions during excavation of soils and during removal and treatment of waste.</p> <p>Limits exposure of radioactive contamination release to 10 mrem/yr for the off-Site receptor and establishes monitoring and compliance requirements.</p>	A	<p>Radionuclide emission calculations and air modeling for Phase 1 treatment are presented in Attachment 4. The model resulted in an estimate of approximately 1.05 E-2 mrem/yr dose at the INEEL fence line located 12 km (7.5 mi) northeast of TAN. The calculated emissions will be included in the INEEL's annual NESHAP report, which determines the effective dose equivalent from the INEEL to members of the public.</p>
IDAPA 58.01.01.650 and .651 (formerly IDAPA 16.01.01.650 and .651), Rules for Control of Fugitive Dust.	<p>Applies to air emissions during excavation of soils and during removal and treatment of waste.</p> <p>Requires control of dust during excavation and removal of the tanks and piping.</p>	A	<p>Dust suppression measures will be implemented, as necessary, during the remedial action to minimize the generation of fugitive dust, as indicated in the HASP. These measures may include water/surfactant sprays, keeping vehicle speeds to a minimum, covers for trucks and staging piles, and work controls during periods of high wind.</p>

Table A-1. (continued).

Requirement (Citation)	Comment	Relevancy ^a	Compliance Strategy
Generator Standards			
IDAPA 58.01.05.006 (formerly IDAPA 16.01.05.006), Standards Applicable to Generators of Hazardous Waste, and the following, as cited in it:			
40 CFR 262.11, Hazardous Waste Determination IDAPA 16.01.05.006	Applies to contaminated soils and tank waste, as well as newly generated secondary waste. A hazardous waste determination (HWD) is required for the waste, tanks, piping, and any secondary waste generated during remediation.	A	A Waste Management Plan ^e specifies how a HWD will be based on an evaluation of sampling data and process knowledge to determine characterization of the waste.
40 CFR 262.20–23 The Manifest	Applies to contaminated soils and tank waste, as well as newly generated secondary waste that will be transported. Establishes requirements for transporting hazardous waste to the treatment and/or disposal site.	A	Prior to transporting hazardous waste, Uniform Hazardous Waste Manifests or INEEL equivalent will be prepared. (See WMP ^c).
40 CFR 262.30–33, Pre-Transport Requirements IDAPA 16.01.05.006	Applies to contaminated soils and tank waste, as well as newly generated secondary waste that will be transported.	A	The waste will be packaged, labeled, marked, and placarded for transportation. (See WMP ^c).
General Facility Standards			
IDAPA 58.01.05.008 (formerly IDAPA 16.01.05.008), Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities, and the following, as cited in it:			
40 CFR 264.13 (a)(1-3), General Waste Analysis IDAPA 16.01.05.008	Applies to V-Tanks waste before treatment and after treatment but before disposal. Analysis requirements apply to the soils, waste, tanks, piping, and secondary waste generated during remediation.	A	The waste in the V-tanks will be appropriately analyzed for the parameters important to the treatment process selected prior to treatment. Treated waste and other secondary wastes will be characterized in accordance with the FSP, ^d WMP, ^c and ICDF WAC ^e to determine whether the generated waste material meets the acceptance criteria.

Table A-1. (continued).

Requirement (Citation)	Comment	Relevancy ^a	Compliance Strategy
40 CFR 264.14, Security IDAPA 16.01.05.008	Applies to the treatment facility for the V-Tanks waste at TSF. Measures must be taken to restrict access to the site during excavation; removal of the waste, tanks, and piping; and decontamination of the tank and piping.	A	INEEL security measures, such as access restrictions, will be implemented during remediation activities. Warning signs will be posted. Temporary construction barriers will be erected around the excavation for access restriction. Access to the treatment process will be restricted to workers appropriately trained, etc.
40 CFR 264.15, General Inspections Requirements IDAPA 16.01.05.008	Applies to the treatment facility for the V-Tanks waste at TSF. Regular inspections must be performed during remediation.	A	While waste is in the tank systems, the tanks, treatment system, and piping will be inspected on a daily basis. After all waste is solidified or stabilized, inspections will be decreased to weekly. Routine inspections will be conducted during and following remediation. During remediation activities, inspections will be conducted to fulfill requirements of 40 CFR 264 Subparts I and J. After remediation, waste in onsite storage will be inspected to meet the requirements of 40 CFR Subparts I and J.
40 CFR 264.16, Personnel Training IDAPA 16.01.05.008	Applies to the treatment facility for the V-Tanks waste at TSF All personnel involved in soil excavation; waste treatment removal of the waste, tanks, and piping; and decontamination of the tank and piping must be trained.	A	The substantive training requirements for training are listed in the HASP. ^b Personnel will be trained in hazardous waste management requirements.
40 CFR 264, Subpart C, Preparedness and Prevention IDAPA 16.01.05.008	Applies to the treatment facility for the V-Tanks waste at TSF. Applies to soil excavation, waste and tank system removal, and decontamination activities.	A	Emergency equipment (e.g., fire extinguishers, communications systems) will be identified, tested, and maintained as described in the site HASP. The arrangements with local authorities will also be detailed.
40 CFR 264, Subpart D, Contingency Plan and Emergency Procedures IDAPA 16.01.05.008	Applies to the treatment facility for the V-Tanks waste at TSF. Applies to soil excavation, waste and tank system removal, and decontamination activities.	A	The substantive requirements of a contingency plan will be maintained in the site HASP. The HASP establishes an emergency response plan that documents the coordinated course of action to be followed in case of a fire, explosion, or release of hazardous waste or hazardous waste constituents, which could threaten human health or the environment.
40 CFR 264.111 (a) and (b), Closure Performance Standards	Applies to the V-Tanks site after waste removal.	A	TSF-09 and TSF-18 will be closed in accordance with the RCRA closure plan and this RD/RAWP. The Consolidation Tanks and treatment system will be decontaminated to the extent practicable and disposed of at the ICDF.

Table A-1. (continued).

Requirement (Citation)	Comment	Relevancy ^a	Compliance Strategy
40 CFR 264.114, Disposal or decontamination of equipment, Structures, Soils IDAPA 16.01.05.008	Applies to equipment used to remove waste and soils, to treat tank waste, and to transport treated waste and contaminated soil. Also applies to the V-Tanks and ancillary lines and equipment. All equipment used during remediation must be decontaminated if hazardous waste is contacted.	A	Equipment decontamination will be conducted in accordance with the project Waste Management Plan ^c and the Decontamination Plan. ^f Decontamination waste will be considered secondary waste and managed appropriately.
40 CFR 264.171–178, Use and Management of Containers IDAPA 16.01.05.008	Applies to containers used during the removal and treatment of V-Tanks waste at TSF. Applicable to the soils, waste, tanks, piping, and any secondary hazardous waste-generated remediation that is managed in containers.	A	All containers will be selected to ensure waste is compatible with the container and container integrity is maintained. Weekly inspections will be conducted. Secondary containment for all containers with free liquids will be used. Overpack containers will be maintained in storage at TAN if it becomes necessary to overpack a container found not to be in good condition or leaking.
40 CFR 264.192–196, Tanks Systems	Added as applicable to new tank systems used to treat or store V-Tanks waste.	A	This RD/RAWP is intended to demonstrate compliance with the substantive requirements of this citation. Table A-2 in this Appendix provides a detailed compliance matrix that lists the Subpart J requirements and demonstrates how compliance is achieved.
40 CFR 264.197(a), Tank Closure and Post-Closure Care IDAPA 16.01.05.008	Applies to the V-Tanks and to new tanks used in the treatment system at TSF. Applies to the soils, waste, tanks, and piping.	A	At the completion of closure, waste will be removed as practicable from the consolidation tanks and treatment system. This equipment will either be flushed and held for future use or will be disposed of as mixed waste.
40 CFR 264.553(c) and (e), Temporary Units	Added as applicable to the use of the V-Tanks for the accumulation and subsequent storage of treated waste.	A	No longer applicable to selected remedial approach as existing tanks will not be used as consolidation tanks. Optimization of the treatment approach has resulted in no temporary units being deployed.
40 CFR 264.554 (a) to (k), Staging Piles	Added as applicable to staging piles of contaminated soils.	A	Staging piles will be used to facilitate transport of contaminated soils and debris to the ICDF. These piles will be removed by the end of the next operating season from the time waste transfer begins. Only soil and compatible debris will be placed in the staging area. Removal of the debris and soil piles, plus an additional 6 in. of soil will constitute closure of the staging pile. The staging pile will be covered with an HPDE tarp or a fixative material when not in use. Sandbags will be used to secure the tarps. Alternatively, soil bags may be used instead of bulk soil staging piles. If soil bags are used,

Table A-1. (continued).

Requirement (Citation)	Comment	Relevancy ^a	Compliance Strategy
			the bags will be closed. and sealed but not covered.
Land Disposal Restrictions			
IDAPA 58.01.05.011 (formerly IDAPA 16.01.05.011), Land Disposal Restrictions, and the following, as cited in it:			
40 CFR 268.40(a)(b)(e), Applicability of Treatment Standards IDAPA 16.01.05.011	Applies to V-Tanks waste and secondary wastes generated during treatment of the V-Tanks waste. The waste, tank, and piping must be treated, if necessary, to meet land disposal restriction (LDR) criteria before disposal.	A	Treated waste must meet LDR standards. After sparging, the waste will be analyzed to confirm if the waste is not RCRA Characteristic. If the waste is not RCRA-characteristic, then the waste must meet applicable LDR standards. If the waste is RCRA characteristic, it must be treated for underlying hazardous constituents as well.
40 CFR 268.45, Treatment Standards for Hazardous Debris IDAPA 16.01.05.011	Applies to V-Tanks debris and debris associated with the treatment system at TSF.	A	Treated waste must meet LDR standards After sparging, the waste will be analyzed to confirm if the waste is not RCRA Characteristic. If the waste is not RCRA-characteristic, then the waste must meet applicable LDR standards. If the waste is RCRA characteristic, it must be treated for underlying hazardous constituents as well.
40 CFR 268.48(a), Universal Treatment Standards IDAPA 16.01.05.011	Applies to V-Tanks waste and secondary wastes generated during treatment of the V-Tanks waste.	A	Treated waste must meet LDR standards. After sparging, the waste will be analyzed to confirm if the waste is not RCRA Characteristic. If the waste is not RCRA-characteristic, then the waste must meet applicable LDR standards. If the waste is RCRA characteristic, it must be treated for underlying hazardous constituents as well.
40 CFR 268.49, Alternative LDR Treatment Standards for Contaminated Soil IDAPA 16.01.05.011	Applies to contaminated soil from around the V-Tanks. Applies to any contaminated soil that is to be removed from the V-Tank and disposed of at an approved facility on the INEEL or off the INEEL.	A	Prior to excavation, the soil excavation will be sampled by the ICDF subcontractor to verify that the it meets the applicable WAC requirements for disposal.
Toxic Substance Control Act (TSCA)			
40 CFR 761.61(c), Remediation Waste: Risk-based Disposal Approval	Applicable to management and disposal of polychlorinated biphenyl (PCB) Remediation Waste at the INEEL.	A	An EDF (EDF-3077) detailing an alternative risk-based management approach for PCB remediation waste was submitted with the ROD amendment. Approval of that ROD Amendment constituted approval of that alternative approach. The EDF was revised to support the ESD, both of which were approved by the Agencies.

Table A-1. (continued).

Requirement (Citation)	Comment	Relevancy ^a	Compliance Strategy
40 CFR 761.79(b)(1), PCB Decontamination Standards and Procedures: Decontamination Standards	Applicable to decontamination of equipment used to manage PCB contaminated waste.	A	Most, if not all, equipment coming into contact with the waste will be disposed of rather than decontaminated.
40 CFR 761.79(c)(1) and (2), Decontamination Standards and Procedures: Self-Implementing Decontamination Procedures	Applicable to decontamination of equipment used to manage PCB contaminated waste. Applies to decontamination of the tank, piping, and equipment that comes into contact with the tank waste.	A	Most, if not all, equipment coming into contact with the waste will be disposed of rather than decontaminated. For debris consisting of tanks, piping, and equipment, the current strategy will be to meet the ICDF WAC. Decontamination will be conducted according to the Waste Management Plan ^c and the Decontamination Plan. ^f
40 CFR 761.79(d), Decontamination Solvents	Applicable to decontamination of equipment used to manage PCB contaminated waste. Applies to solvents used for decontamination.	A	Most, if not all, equipment coming into contact with the waste will be disposed of rather than decontaminated.
40 CFR 761.79(e), Limitation of Exposure and Control of Releases	Applicable to decontamination of equipment used to manage PCB contaminated waste. Applies to all persons who will be conducting decontamination activities of the tank and piping.	A	Most, if not all, equipment coming into contact with the waste will be disposed of rather than decontaminated. For personnel performing decontamination activities, the workers will comply with the HASP ^b for this project.
40 CFR 761.79(g), Decontamination Waste and Residues	Applicable to decontamination of equipment used to manage PCB contaminated waste. Applies to the decontamination of waste and residuals.	A	Most, if not all, equipment coming into contact with the waste will be disposed of rather than decontaminated. For decontamination waste and residues, the current strategy will be to meet the ICDF WAC. ^e All liquids will be solidified or stabilized prior to shipment.
40 CFR 761.65(c)(9) as amended by EPA Risk-based approval for temporary storage of non-liquid PCB waste dated June 19, 2002	Applies to CERCLA generated soils, debris, and other miscellaneous waste contaminated with PCB bulk product or PCB remediation waste.	TBC	Waste contaminated with PCB Bulk Product Waste or PCB Remediation Waste will be stored in a CERCLA waste storage area in compliance with the requirements of the EPA Risk Based Approval dated June 19, 2003. These wastes will be stored in CERCLA waste storage areas as necessary to support remedial activities and ultimate disposal under this workplan. Storage under these alternative storage requirements shall be limited to 180 days unless sufficient rationale is provided to extend that time.

Table A-1. (continued).

Requirement (Citation)	Comment	Relevancy ^a	Compliance Strategy
DOE Orders			
DOE Order 5400.5, Chapter II (1)(a, b), Radiation Protection of the Public and the Environment	Applies to the V-Tanks site before, during, and after remediation. Order that limits the effective dose to the public from exposure to radiation sources and airborne releases.	TBC	The APAD will confirm that the external dose to the public is within acceptable limits.
DOE Order 435.1, Radioactive Waste Management	Applies to the V-Tanks site before, during, and after remediation.	TBC	Waste generated as part of this remedial activity will be managed as appropriate according to DOE Order 435.1.
<p>a. A = applicable or relevant and appropriate requirement TBC = To Be Considered</p> <p>b. ICP, 2004d, <i>Health and Safety Plan for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10</i>, ICP/EXT-04-00429, Rev 0, Idaho Completion Project, September 2004.</p> <p>c. ICP, 2004b, <i>Waste Management Plan for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10</i>, ICP/EXT-04-00429, Rev 0, Idaho Completion Project, September 2004.</p> <p>d. ICP, 2004a, <i>Field Sampling Plan for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10</i>, ICP/EXT-04-00429, Rev 0, Idaho Completion Project, September 2004.</p> <p>e. DOE-ID, 2004d, <i>Waste Acceptance Criteria for ICDF Landfill</i>, DOE/ID-10865, Rev. 7, August 2004.</p> <p>f. ICP, 2004c, <i>Decontamination Plan for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10</i>, ICP/EXT-04-00429, Rev 0, Idaho Completion Project, September 2004.</p> <p>ARAR = applicable or relevant and appropriate requirement CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act CFR = Code of Federal Regulations EPA = U.S. Environmental Protection Agency HASP = Health and Safety Plan HWD = hazardous waste determination ICDF = INEEL CERCLA Disposal Facility IDAPA = Idaho Administrative Procedures Act (Note: The original ROD ARARs [16.00 series] will continue to be cited and will remain in effect, as 16.01, but the numbering system has been changed to 58.01 [58.00 series]). INEEL = Idaho National Engineering and Environmental Laboratory LDR = land disposal restriction NESHAP = National Emission Standards for Hazardous Air Pollutants OSHA = Occupational Safety and Health Act PCB = polychlorinated biphenyl PRD = Program Requirements Document RCRA = Resource Conservation and Recovery Act RD/RAWP = Remedial Design/Remedial Action Work Plan TAN = Test Area North TBC = To Be Considered. TBCs are not classified as applicable or relevant and appropriate. TSF = Technical Support Facility WAC = Waste Acceptance Criteria</p>			

Table A-2 lists the specific citations from 40 CFR 264 Subpart J. This table categorizes each citation as either a header item, or a design, administrative, or operational item. The approach to compliance for items that have design or operational implications are addressed. No compliance approach is given for items that are not applicable, administrative, or simply header citations.

Table A-2 Detailed compliance matrix for 40 CFR 264 Subpart J.

Item	Citation	Compliance Category	Approach
1	§192. Design and installation of new tank systems or components	Header	
2	(a) Owners or operators of new tank systems or components must obtain and submit to the Regional Administrator, at time of submittal of part B information, a written assessment, reviewed and certified by an independent, qualified registered professional engineer, in accordance with §270.11(d), attesting that the tank system has sufficient structural integrity and is acceptable for the storing and treating of hazardous waste. The assessment must show that the foundation, structural support, seams, connections, and pressure controls (if applicable) are adequately designed and that the tank system has sufficient structural strength, compatibility with the waste(s) to be stored or treated, and corrosion protection to ensure that it will not collapse, rupture, or fail. This assessment, which will be used by the Regional Administrator to review and approve or disapprove the acceptability of the tank system design, must include, at a minimum, the following information:	Design	All design drawings and specifications will be stamped by an Idaho Registered Professional Engineer.
3	(1) Design standard(s) according to which tank(s) and/or the ancillary equipment are constructed;	Header	The work plan specifies the design standard to which the tanks are constructed. See Attachment 2, Division 15.
4	(2) Hazardous characteristics of the waste(s) to be handled;	Header	The RD/RAWP and previous waste characterization efforts specify the hazardous characteristic to be handled.

Table A-2. (continued).

Item	Citation	Compliance Category	Approach
5	(3) For new tank systems or components in which the external shell of a metal tank or any external metal component of the tank system will be in contact with the soil or with water, a determination by a corrosion expert of:	Design	NA
6	(i) Factors affecting the potential for corrosion, including but not limited to:	Design	
7	(A) Soil moisture content;	Design	
8	(B) Soil pH;	Design	
9	(C) Soil sulfides level;	Design	
10	(D) Soil resistivity;	Design	
11	(E) Structure to soil potential;	Design	
12	(F) Influence of nearby underground metal structures (e.g., piping);	Design	
13	(G) Existence of stray electric current;	Design	
14	(H) Existing corrosion-protection measures (e.g., coating, cathodic protection), and	Design	
15	(ii) The type and degree of external corrosion protection that are needed to ensure the integrity of the tank system during the use of the tank system or component, consisting of one or more of the following:	Design	
16	(A) Corrosion-resistant materials of construction such as special alloys, fiberglass reinforced plastic, etc.;	Design	
17	(B) Corrosion-resistant coating (such as epoxy, fiberglass, etc.) with cathodic protection (e.g., impressed current or sacrificial anodes); and	Design	

Table A-2. (continued).

Item	Citation	Compliance Category	Approach
18	(C) Electrical isolation devices such as insulating joints, flanges, etc.	Design	
19			
20	Note: The practices described in the National Association of Corrosion Engineers [NACE] standard, “Recommended Practice [RP-02-85]-Control of External Corrosion on Metallic Buried, Partially Buried, or Submerged Liquid Storage Systems,” and the American Petroleum Institute [API] Publication 1632, “Cathodic Protection of Underground Petroleum Storage Tanks and Piping Systems,” may be used, where applicable, as guidelines in providing corrosion protection for tank systems.)	Header	
21	(4) For underground tank system components that are likely to be adversely affected by vehicular traffic, a determination of design or operational measures that will protect the tank system against potential damage; and	NA	NA
22	(5) Design considerations to ensure that:	Header	—
23	(i) Tank foundations will maintain the load of a full tank;	Design	The engineering design files in Attachment 3 document that documents that the floor is capable of maintaining all three tanks when full.
24	(ii) Tank systems will be anchored to prevent flotation or dislodgment where the tank system is placed in a saturated zone, or is located within a seismic fault zone subject to the standards of §264.18(a); and	NA	NA
25	(iii) Tank systems will withstand the effects of frost heave.	NA	NA

Table A-2. (continued).

Item	Citation	Compliance Category	Approach
26	(b) [PE Certification Bookmark] The owner or operator of a new tank system must ensure that proper handling procedures are adhered to in order to prevent damage to the system during installation. Prior to covering, enclosing, or placing a new tank system or component in use, an independent, qualified installation inspector or an independent, qualified, registered professional engineer, either of whom is trained and experienced in the proper installation of tank systems or components, must inspect the system for the presence of any of the following items:	Design	Section 4.3.8 and 6.2.10 provide for a qualified installation inspector or a qualified, registered professional engineer, either of whom is trained and experienced in the proper installation of tank systems or components, to inspect the system for the presence of the discrepancies mentioned. The work plan shall provide for documentation that these discrepancies are resolved prior to use.
27	(1) Weld breaks;	Design	
28	(2) Punctures;	Design	
29	(3) Scrapes of protective coatings;	Design	
30	(4) Cracks;	Design	
31	(5) Corrosion;	Design	
32	(6) Other structural damage or inadequate construction/installation.	Design	
33	All discrepancies must be remedied before the tank system is covered, enclosed, or placed in use.	Design	
34	(c) New tank systems or components that are placed underground and that are backfilled must be provided with a backfill material that is a noncorrosive, porous, homogeneous substance and that is installed so that the backfill is placed completely around the tank and compacted to ensure that the tank and piping are fully and uniformly supported.	NA	NA
35	(d) All new tanks and ancillary equipment must be tested for tightness prior to being covered, enclosed, or placed in use. If a tank system is found not to be tight, all repairs necessary to remedy the leak(s) in the system must be performed prior to the tank system being covered, enclosed, or placed into use.	Design	The work plan will provide a plan for mockup simulation and pre-startup tests for functional operation. Any discrepancies will be corrected. See RD/RAWP Addendum 2, Section 6.2.7

Table A-2. (continued).

Item	Citation	Compliance Category	Approach
36	(e) Ancillary equipment must be supported and protected against physical damage and excessive stress due to settlement, vibration, expansion, or contraction.	Design	The work plan shall provide a design that documents that ancillary equipment is prevented from physical damage and excessive stress.
37	(Note:	Header	NA
38	The piping system installation procedures described in American Petroleum Institute [API] Publication 1615 [November 1979], "Installation of Underground Petroleum Storage Systems," or ANSI Standard B31.3, "Petroleum Refinery Piping," and ANSI Standard B31.4 "Liquid Petroleum Transportation Piping System," may be used, where applicable, as guidelines for proper installation of piping systems.)	NA	
39	(f) The owner or operator must provide the type and degree of corrosion protection recommended by an independent corrosion expert, based on the information provided under paragraph (a)(3) of this section, or other corrosion protection if the Regional Administrator believes other corrosion protection is necessary to ensure the integrity of the tank system during use of the tank system. The installation of a corrosion protection system that is field fabricated must be supervised by an independent corrosion expert to ensure proper installation.	Design	The work plan documents that corrosion issues have been adequately examined. See Appendix C EDF-4602
40	(g) The owner or operator must obtain and keep on file at the facility written statements by those persons required to certify the design of the tank system and supervise the installation of the tank system in accordance with the requirements of paragraphs (b) through (f) of this section, that attest that the tank system was properly designed and installed and that repairs, pursuant to paragraphs (b) and (d) of this section, were performed. These written statements must also include the certification statement as required in §270.11(d) of this chapter.	Administrative	NA
41	(51 FR 25472, July 14, 1986; 51 FR 29430, Aug. 15, 1986)		
42	§193. Containment and detection of releases		
43	(a) In order to prevent the release of hazardous waste or hazardous constituents to the environment, secondary containment that meets the requirements of this section must be provided (except as provided in paragraphs (f) and (g) of this section):	Design	The work plan provides drawings of the approach to secondary containment for tanks and associated

Table A-2. (continued).

Item	Citation	Compliance Category	Approach
44	(1) For all new tank systems or components, prior to their being put into service;		pipng. See Attachment 1, and Section 4.3.3
45	(2) For all existing tank systems used to store or treat EPA Hazardous Waste Nos. F020, F021, F022, F023, F026, and F027, within two years after January 12, 1987;	NA	NA
46	(3) For those existing tank systems of known and documented age, within two years after January 12, 1987 or when the tank system has reached 15 years of age, whichever comes later;	NA	NA
47	(4) For those existing tank systems for which the age cannot be documented, within eight years of January 12, 1987; but if the age of the facility is greater than seven years, secondary containment must be provided by the time the facility reaches 15 years of age, or within two years of January 12, 1987, whichever comes later; and	NA	NA
48	(5) For tank systems that store or treat materials that become hazardous wastes subsequent to January 12, 1987, within the time intervals required in paragraphs (a)(1) through (a)(4) of this section, except that the date that a material becomes a hazardous waste must be used in place of January 12, 1987.	Design	NA
49	(b) Secondary containment systems must be:		See above for 40 CFR 264.193(a)
50	(1) Designed, installed, and operated to prevent any migration of wastes or accumulated liquid out of the system to the soil, ground water, or surface water at any time during the use of the tank system; and	Design	
51	(2) Capable of detecting and collecting releases and accumulated liquids until the collected material is removed.	Design	
52	(c) To meet the requirements of paragraph (b) of this section, secondary containment systems must be at a minimum:	Header	See above for 40 CFR 264.193(a)

Table A-2. (continued).

Item	Citation	Compliance Category	Approach
53	(1) Constructed of or lined with materials that are compatible with the wastes(s) to be placed in the tank system and must have sufficient strength and thickness to prevent failure owing to pressure gradients (including static head and external hydrological forces), physical contact with the waste to which it is exposed, climatic conditions, and the stress of daily operation (including stresses from nearby vehicular traffic).	Design	
54	(2) Placed on a foundation or base capable of providing support to the secondary containment system, resistance to pressure gradients above and below the system, and capable of preventing failure due to settlement, compression, or uplift;	Design	
55	(3) Provided with a leak-detection system that is designed and operated so that it will detect the failure of either the primary or secondary containment structure or the presence of any release of hazardous waste or accumulated liquid in the secondary containment system within 24 hours, or at the earliest practicable time if the owner or operator can demonstrate to the Regional Administrator that existing detection technologies or site conditions will not allow detection of a release within 24 hours; and	Design	
56	(4) Sloped or otherwise designed or operated to drain and remove liquids resulting from leaks, spills, or precipitation. Spilled or leaked waste and accumulated precipitation must be removed from the secondary containment system within 24 hours, or in as timely a manner as is possible to prevent harm to human health and the environment, if the owner or operator can demonstrate to the Regional Administrator that removal of the released waste or accumulated precipitation cannot be accomplished within 24 hours.	Design	
57	(Note:		

Table A-2. (continued).

Item	Citation	Compliance Category	Approach
58	If the collected material is a hazardous waste under part 261 of this chapter, it is subject to management as a hazardous waste in accordance with all applicable requirements of parts 262 through 265 of this chapter. If the collected material is discharged through a point source to waters of the United States, it is subject to the requirements of sections 301, 304, and 402 of the Clean Water Act, as amended. If discharged to a Publicly Owned Treatment Works [POTW], it is subject to the requirements of section 307 of the Clean Water Act, as amended. If the collected material is released to the environment, it may be subject to the reporting requirements of 40 CFR part 302.)		
59	(d) Secondary containment for tanks must include one or more of the following devices:		See above for 40 CFR 264.193(a)
60	(1) A liner (external to the tank);	Design	
61	(2) A vault;	Design	
62	(3) A double-walled tank; or	Design	
63	(4) An equivalent device as approved by the Regional Administrator	Design	
64	(e) In addition to the requirements of paragraphs (b), (c), and (d) of this section, secondary containment systems must satisfy the following requirements:	Design	See above for 40 CFR 264.193(a)
65	(1) External liner systems must be:	Design	
66	(i) Designed or operated to contain 100 percent of the capacity of the largest tank within its boundary;	Design	
67	(ii) Designed or operated to prevent run-on or infiltration of precipitation into the secondary containment system unless the collection system has sufficient excess capacity to contain run-on or infiltration. Such additional capacity must be sufficient to contain precipitation from a 25-year, 24-hour rainfall event.	Design	
68	(iii) Free of cracks or gaps; and	Design	
69	(iv) Designed and installed to surround the tank completely and to cover all surrounding earth likely to come into contact with the waste if the waste is released from the tank(s) (i.e., capable of preventing lateral as well as vertical migration of the waste).	Design	

Table A-2. (continued).

Item	Citation	Compliance Category	Approach
70	(2) Vault systems must be:	NA	NA
71	(i) Designed or operated to contain 100 percent of the capacity of the largest tank within its boundary;	NA	
72	(ii) Designed or operated to prevent run-on or infiltration of precipitation into the secondary containment system unless the collection system has sufficient excess capacity to contain run-on or infiltration. Such additional capacity must be sufficient to contain precipitation from a 25-year, 24-hour rainfall event:	NA	
73	(iii) Constructed with chemical-resistant water stops in place at all joints (if any):	NA	
74	(iv) Provided with an impermeable interior coating or lining that is compatible with the stored waste and that will prevent migration of waste into the concrete;	NA	
75	(v) Provided with a means to protect against the formation of and ignition of vapors within the vault, if the waste being stored or treated:	NA	
76	(A) Meets the definition of ignitable waste under §262.21 of this chapter; or	NA	
77	(B) Meets the definition of reactive waste under §262.21 of this chapter, and may form an ignitable or explosive vapor.	NA	
78	(vi) Provided with an exterior moisture barrier or be otherwise designed or operated to prevent migration of moisture into the vault if the vault is subject to hydraulic pressure.	NA	
79	(3) Double-walled tanks must be:	NA	
80	(i) Designed as an integral structure (i.e., an inner tank completely enveloped within an outer shell) so that any release from the inner tank is contained by the outer shell.	NA	
81	(ii) Protected, if constructed of metal, from both corrosion of the primary tank interior and of the external surface of the outer shell; and	NA	

Table A-2. (continued).

Item	Citation	Compliance Category	Approach
82	(iii) Provided with a built-in continuous leak detection system capable of detecting a release within 24 hours, or at the earliest practicable time, if the owner or operator can demonstrate to the Regional Administrator, and the Regional Administrator concludes, that the existing detection technology or site conditions would not allow detection of a release within 24 hours.	NA	
83	[Note:	Header	
84	The provisions outlined in the Steel Tank Institute's (STI) "Standard for Dual Wall Underground Steel Storage Tanks" may be used as guidelines for aspects of the design of underground steel double-walled tanks.]	Header	
85	(f) Ancillary equipment must be provided with secondary containment (e.g., trench, jacketing, double-walled piping) that meets the requirements of paragraphs (b) and (c) of this section except for:	Design	See above for 40 CFR 264.193(a)
86	(1) Aboveground piping (exclusive of flanges, joints, valves, and other connections) that are visually inspected for leaks on a daily basis;	Operation	
87	(2) Welded flanges, welded joints, and welded connections, that are visually inspected for leaks on a daily basis;	Operation	
88	(3) Sealless or magnetic coupling pumps and sealless valves, that are visually inspected for leaks on a daily basis; and	Operation	
89	(4) Pressurized aboveground piping systems with automatic shut-off devices (e.g., excess flow check valves, flow metering shutdown devices, loss of pressure actuated shut-off devices) that are visually inspected for leaks on a daily basis.	Operation	

Table A-2. (continued).

Item	Citation	Compliance Category	Approach
90	(g) The owner or operator may obtain a variance from the requirements of this section if the Regional Administrator finds, as a result of a demonstration by the owner or operator that alternative design and operating practices, together with location characteristics, will prevent the migration of any hazardous waste or hazardous constituents into the ground water; or surface water at least as effectively as secondary containment during the active life of the tank system or that in the event of a release that does migrate to ground water or surface water, no substantial present or potential hazard will be posed to human health or the environment. New underground tank systems may not, per a demonstration in accordance with paragraph (g)(2) of this section, be exempted from the secondary containment requirements of this section.	NA	NA
91	(1) In deciding whether to grant a variance based on a demonstration of equivalent protection of ground water and surface water, the Regional Administrator will consider:	NA	
92	(i) The nature and quantity of the wastes;	NA	
93	(ii) The proposed alternate design and operation;	NA	
94	(iii) The hydrogeologic setting of the facility, including the thickness of soils present between the tank system and ground water, and	NA	
95	(iv) All other factors that would influence the quality and mobility of the hazardous constituents and the potential for them to migrate to ground water or surface water	NA	
96	(2) In deciding whether to grant a variance based on a demonstration of no substantial present or potential hazard, the Regional Administrator will consider:	NA	
97	(i) The potential adverse effects on ground water, surface water, and land quality taking into account:	NA	
98	(A) The physical and chemical characteristics of the waste in the tank system, including its potential for migration.	NA	
99	(B) The hydrogeological characteristics of the facility and surrounding land,	NA	
100	(C) The potential for health risks caused by human exposure to waste constituents,	NA	

Table A-2. (continued).

Item	Citation	Compliance Category	Approach
101	(D) The potential for damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents, and	NA	
102	(E) The persistence and permanence of the potential adverse effects;	NA	
103	(ii) The potential adverse effects of a release on ground-water quality, taking into account:	NA	
104	(A) The quantity and quality of ground water and the direction of ground-water flow,	NA	
105	(B) The proximity and withdrawal rates of ground-water users,	NA	
106	(C) The current and future uses of ground water in the area, and	NA	
107	(D) The existing quality of ground water, including other sources of contamination and their cumulative impact on the ground-water quality;	NA	
108	(iii) The potential adverse effects of a release on surface water quality, taking into account:	NA	
109	(A) The quantity and quality of ground water and the direction of ground-water flow,	NA	
110	(B) The patterns of rainfall in the region,	NA	
111	(C) The proximity of the tank system to surface waters,	NA	
112	(D) The current and future uses of surface waters in the area and any water quality standards established for those surface waters, and	NA	
113	(E) The existing quality of surface water, including other sources of contamination and the cumulative impact on surface-water quality; and	NA	
114	(iv) The potential adverse effects of a release on the land surrounding the tank system, taking into account:	NA	
115	(A) The patterns of rainfall in the region, and	NA	
116	(B) The current and future uses of the surrounding land.	NA	

Table A-2. (continued).

Item	Citation	Compliance Category	Approach
117	(3) The owner or operator of a tank system, for which a variance from secondary containment had been granted in accordance with the requirements of paragraph (g)(1) of this section, at which a release of hazardous waste has occurred from the primary tank system but has not migrated beyond the zone of engineering control (as established in the variance), must:	NA	
118	(i) Comply with the requirements of §264.196, except paragraph (d), and	NA	
119	(ii) Decontaminate or remove contaminated soil to the extent necessary to:	NA	
120	(A) Enable the tank system for which the variance was granted to resume operation with the capability for the detection of releases at least equivalent to the capability it had prior to the release; and	NA	
121	(B) Prevent the migration of hazardous waste or hazardous constituents to ground water or surface water; and	NA	
122	(iii) If contaminated soil cannot be removed or decontaminated in accordance with paragraph (g)(3)(ii) of this section, comply with the requirement of §264.197(b).	NA	
123	(4) The owner or operator of a tank system, for which a variance from secondary containment had been granted in accordance with the requirements of paragraph (g)(1) of this section, at which a release of hazardous waste has occurred from the primary tank system and has migrated beyond the zone of engineering control (as established in the variance), must:	NA	
124	(i) Comply with the requirements of §264.196 (a), (b), (c), and (d); and	NA	
125	(ii) Prevent the migration of hazardous waste or hazardous constituents to ground water or surface water, if possible, and decontaminate or remove contaminated soil. If contaminated soil cannot be decontaminated or removed or if ground water has been contaminated, the owner or operator must comply with the requirements of §264.197(b); and	NA	

Table A-2. (continued).

Item	Citation	Compliance Category	Approach
126	(iii) If repairing, replacing, or reinstalling the tank system, provide secondary containment in accordance with the requirements of paragraphs (a) through (f) of this section or reapply for a variance from secondary containment and meet the requirements for new tank systems in §264.192 if the tank system is replaced. The owner or operator must comply with these requirements even if contaminated soil can be decontaminated or removed and ground water or surface water has not been contaminated.	NA	
127	(h) The following procedures must be followed in order to request a variance from secondary containment:	NA	NA
128	(1) The Regional Administrator must be notified in writing by the owner or operator that he intends to conduct and submit a demonstration for a variance from secondary containment as allowed in paragraph (g) of this section according to the following schedule:	NA	
129	(i) For existing tank systems, at least 24 months prior to the date that secondary containment must be provided in accordance with paragraph (a) of this section.	NA	
130	(ii) For new tank systems, at least 30 days prior to entering into a contract for installation.	NA	
131	(2) As part of the notification, the owner or operator must also submit to the Regional Administrator a description of the steps necessary to conduct the demonstration and a timetable for completing each of the steps. The demonstration must address each of the factors listed in paragraph (g)(1) or paragraph (g)(2) of this section;	NA	
132	(3) The demonstration for a variance must be completed within 180 days after notifying the Regional Administrator of an intent to conduct the demonstration; and	NA	
133	(4) If a variance is granted under this paragraph, the Regional Administrator will require the permittee to construct and operate the tank system in the manner that was demonstrated to meet the requirements for the variance.	NA	
134	(i) All tank systems, until such time as secondary containment that meets the requirements of this section is provided, must comply with the following:	NA	

Table A-2. (continued).

Item	Citation	Compliance Category	Approach
135	(1) For non-enterable underground tanks, a leak test that meets the requirements of §264.191(b)(5) or other tank integrity method, as approved or required by the Regional Administrator, must be conducted at least annually.	NA	
136	(2) For other than non-enterable underground tanks, the owner or operator must either conduct a leak test as in paragraph (i)(1) of this section or develop a schedule and procedure for an assessment of the overall condition of the tank system by an independent, qualified registered professional engineer. The schedule and procedure must be adequate to detect obvious cracks, leaks, and corrosion or erosion that may lead to cracks and leaks. The owner or operator must remove the stored waste from the tank, if necessary, to allow the condition of all internal tank surfaces to be assessed. The frequency of these assessments must be based on the material of construction of the tank and its ancillary equipment, the age of the system, the type of corrosion or erosion protection used, the rate of corrosion or erosion observed during the previous inspection, and the characteristics of the waste being stored or treated.	NA	Section 4.3.8 and 6.2.10 provide for a qualified installation inspector or a qualified, registered professional engineer, either of whom is trained and experienced in the proper installation of tank systems or components, to inspect the system for the presence of the discrepancies mentioned. The work plan shall provide for documentation that these discrepancies are resolved prior to use.
137	(3) For ancillary equipment, a leak test or other integrity assessment as approved by the Regional Administrator must be conducted at least annually.	NA	
138	(Note:		
139	The practices described in the American Petroleum Institute [API] Publication Guide for Inspection of Refinery Equipment, Chapter XIII, "Atmospheric and Low-Pressure Storage Tanks," 4th edition, 1981, may be used, where applicable, as guidelines for assessing the overall condition of the tank system.)	—	
140	(4) The owner or operator must maintain on file at the facility a record of the results of the assessments conducted in accordance with paragraphs (i)(1) through (i)(3) of this section.	Administrative	
141	(5) If a tank system or component is found to be leaking or unfit for use as a result of the leak test or assessment in paragraphs (i)(1) through (i)(3) of this section, the owner or operator must comply with the requirements of §264.196.	Administrative	
142	[51 FR 25472, July 14, 1986; 51 FR 29430, Aug. 15, 1986, as amended at 53 FR 34086, Sept. 2, 1988]	—	

Table A-2. (continued).

Item	Citation	Compliance Category	Approach
143	§194. General operating requirements	—	
144	(a) Hazardous wastes or treatment reagents must not be placed in a tank system if they could cause the tank, its ancillary equipment, or the containment system to rupture, leak, corrode, or otherwise fail.	Design	The work plan provides a design that demonstrates compatibility of the waste with tanks. See Attachment 3, EDF-4602
145	(b) The owner or operator must use appropriate controls and practices to prevent spills and overflows from tank or containment systems. These include at a minimum:	Design	The RD/RAWP Addendum 2 design provides the appropriate use of controls and practices to spills and overflows.
146	(1) Spill prevention controls (e.g., check valves, dry disconnect couplings);	Design	
147	(2) Overfill prevention controls (e.g., level sensing devices, high level alarms, automatic feed cutoff, or bypass to a standby tank); and	Design	
148	(3) Maintenance of sufficient freeboard in uncovered tanks to prevent overtopping by wave or wind action or by precipitation.	NA	The design does not include any uncovered tanks.
149	(c) The owner or operator must comply with the requirements of §264.196 if a leak or spill occurs in the tank system.	Operation	The work plan must provide a plan for actions to be taken if a leak or spill occurs per 264.196.
150	§195. Inspections	Operation	All tank systems will be inspected each operating day and noted on a daily log. Operational procedures will be developed to address the required inspections.
151	(a) The owner or operator must develop and follow a schedule and procedure for inspecting overfill controls.	Operation	

Table A-2. (continued).

Table 11-2: (continued).

Item	Citation	Compliance Category	Approach
152	(b) The owner or operator must inspect at least once each operating day:	Operation	The work plan shall provide for daily inspections of the tank system as well as ancilliary equipment to look for releases.
153	(1) Aboveground portions of the tank system, if any, to detect corrosion or releases of waste;	Operation	
154	(2) Data gathered from monitoring and leak detection equipment (e.g., pressure or temperature gauges, monitoring wells) to ensure that the tank system is being operated according to its design; and	Operation	
155	(3) The construction materials and the area immediately surrounding the externally accessible portion of the tank system, including the secondary containment system (e.g., dikes) to detect erosion or signs of releases of hazardous waste (e.g., wet spots, dead vegetation).	Operation	
156	(Note:	Header	
157	Section 264.15[c] requires the owner or operator to remedy any deterioration or malfunction he finds. Section 264.196 requires the owner or operator to notify the Regional Administrator within 24 hours of confirming a leak. Also, 40 CFR part 302 may require the owner or operator to notify the National Response Center of a release.)	Header	
158	(c) The owner or operator must inspect cathodic protection systems, if present, according to, at a minimum, the following schedule to ensure that they are functioning properly:	NA	NA
159	(1) The proper operation of the cathodic protection system must be confirmed within six months after initial installation and annually thereafter; and		

Table A-2. (continued).

Item	Citation	Compliance Category	Approach
160	(2) All sources of impressed current must be inspected and/or tested, as appropriate, at least bimonthly (i.e., every other month).		
161	[Note:		
162	The practices described in the National Association of Corrosion Engineers (NACE) standard, "Recommended Practice (RP-02-85)-Control of External Corrosion on Metallic Buried, Partially Buried, or Submerged Liquid Storage Systems," and the American Petroleum Institute (API) Publication 1632, "Cathodic Protection of Underground Petroleum Storage Tanks and Piping Systems," may be used, where applicable, as guidelines in maintaining and inspecting cathodic protection systems.]		
163	(d) The owner or operator must document in the operating record of the facility an inspection of those items in paragraphs (a) through (c) of this section.	Administrative	The work plan shall provide a plan to address any spill or releases of hazardous materials. This work plan must include cessation of use until repairs are made, removal of waste from that part of the system, cleanup and removal of the released material, reporting of the release to the agencies within one normal working day, and repair of the system as necessary.
164	§196. Response to leaks or spills and disposition of leaking or unfit-for-use tank systems	Header	
165	A tank system or secondary containment system from which there has been a leak or spill, or which is unfit for use, must be removed from service immediately, and the owner or operator must satisfy the following requirements:	Operation	
166	(a) Cessation of use; prevent flow or addition of wastes. The owner or operator must immediately stop the flow of hazardous waste into the tank system or secondary containment system and inspect the system to determine the cause of the release.	Operation	
167	(b) Removal of waste from tank system or secondary containment system. (1) If the release was from the tank system, the owner/operator must, within 24 hours after detection of the leak or, if the owner/operator demonstrates that it is not possible, at the earliest practicable time, remove as much of the waste as is necessary to prevent further release of hazardous waste to the environment and to allow inspection and repair of the tank system to be performed.	Operation	
168	(2) If the material released was to a secondary containment system, all released materials must be removed within 24 hours or in as timely a manner as is possible to prevent harm to human health and the environment.	Operation	

Table A-2. (continued).

Item	Citation	Compliance Category	Approach
169	(c) Containment of visible releases to the environment. The owner/operator must immediately conduct a visual inspection of the release and, based upon that inspection:	Operation	
170	(1) Prevent further migration of the leak or spill to soils or surface water; and	Operation	
171	(2) Remove, and properly dispose of, any visible contamination of the soil or surface water.	Operation	
172	(d) Notifications, reports. (1) Any release to the environment, except as provided in paragraph (d)(2) of this section, must be reported to the Regional Administrator within 24 hours of its detection. If the release has been reported pursuant to 40 CFR part 302, that report will satisfy this requirement.	Operation	
173	(2) A leak or spill of hazardous waste is exempted from the requirements of this paragraph if it is:	Operation	
174	(i) Less than or equal to a quantity of one (1) pound, and	Operation	
175	(ii) Immediately contained and cleaned up.	Operation	
176	(3) Within 30 days of detection of a release to the environment, a report containing the following information must be submitted to the Regional Administrator:	Operation	
177	(i) Likely route of migration of the release;	Operation	
178	(ii) Characteristics of the surrounding soil (soil composition, geology, hydrogeology, climate);	Operation	
179	(iii) Results of any monitoring or sampling conducted in connection with the release (if available). If sampling or monitoring data relating to the release are not available within 30 days, these data must be submitted to the Regional Administrator as soon as they become available.	Operation	
180	(iv) Proximity to downgradient drinking water, surface water, and populated areas; and	Operation	
181	(v) Description of response actions taken or planned.	Operation	

Table A-2. (continued).

Item	Citation	Compliance Category	Approach
182	(e) Provision of secondary containment, repair, or closure. (1) Unless the owner/operator satisfies the requirements of paragraphs (e)(2) through (4) of this section, the tank system must be closed in accordance with §264.197.	Administrative	
183	(2) If the cause of the release was a spill that has not damaged the integrity of the system, the owner/operator may return the system to service as soon as the released waste is removed and repairs, if necessary, are made.	Administrative	
184	(3) If the cause of the release was a leak from the primary tank system into the secondary containment system, the system must be repaired prior to returning the tank system to service.	NA	
185	(4) If the source of the release was a leak to the environment from a component of a tank system without secondary containment, the owner/operator must provide the component of the system from which the leak occurred with secondary containment that satisfies the requirements of §264.193 before it can be returned to service, unless the source of the leak is an aboveground portion of a tank system that can be inspected visually. If the source is an aboveground component that can be inspected visually, the component must be repaired and may be returned to service without secondary containment as long as the requirements of paragraph (f) of this section are satisfied. If a component is replaced to comply with the requirements of this subparagraph, that component must satisfy the requirements for new tank systems or components in §§264.192 and 264.193. Additionally, if a leak has occurred in any portion of a tank system component that is not readily accessible for visual inspection (e.g., the bottom of an inground or onground tank), the entire component must be provided with secondary containment in accordance with §264.193 prior to being returned to use.	NA	

Table A-2. (continued).

Item	Citation	Compliance Category	Approach
186	(f) Certification of major repairs. If the owner/operator has repaired a tank system in accordance with paragraph (e) of this section, and the repair has been extensive (e.g., installation of an internal liner; repair of a ruptured primary containment or secondary containment vessel), the tank system must not be returned to service unless the owner/operator has obtained a certification by an independent, qualified, registered, professional engineer in accordance with §270.11(d) that the repaired system is capable of handling hazardous wastes without release for the intended life of the system. This certification must be submitted to the Regional Administrator within seven days after returning the tank system to use.	NA	
187	(Note:		
188	The Regional Administrator may, on the basis of any information received that there is or has been a release of hazardous waste or hazardous constituents into the environment, issue an order under RCRA section 3004[v], 3008 [h], or 7003 [a] requiring corrective action or such other response as deemed necessary to protect human health or the environment.)	—	
189	(Note:		
190	See §264.15[c] for the requirements necessary to remedy a failure. Also, 40 CFR part 302 may require the owner or operator to notify the National Response Center of certain releases.)	—	
191	(51 FR 25472, July 14, 1986; 51 FR 29430, Aug. 15, 1986, as amended at 53 FR 34086, Sept. 2, 1988)	—	

Appendix B

ARA-16 Source Term Calculations

NOTE: *The document included as Appendix B shows the characterization data for the ARA-16 waste in the “as-found” condition, prior to dewatering.*



Idaho National Engineering and Environmental Laboratory

May 29, 2003

CCN 42770

Ms. Kathleen E. Hain
Environmental Restoration
U.S. Department of Energy
Idaho Operations Office
850 Energy Drive, MS 1222
Idaho Falls, ID 83401-1563

CONTRACT NO. DE-AC07-99ID13727 - TRANSMITTAL OF AUXILIARY REACTOR AREA-16
RADIONUCLIDE TANK WASTE SOURCE TERM CALCULATIONS

Reference: DOE-ID, 2000, *Final Record of Decision for Power Burst Facility and Auxiliary Reactor Area, Operable Unit 5-12*, U.S. Department of Energy Idaho Operations Office, DOE-ID-10700, Rev.0, January 2000

Dear Ms. Hain:

As requested by the Idaho Department of Environmental Quality (IDEQ), transuranic (TRU) source term calculations for the Auxiliary Reactor Area (ARA)-16 Radionuclide Tank waste have been performed. The IDEQ requested the information to support the determination whether the final treated waste form could be disposed in the Idaho National Engineering and Environmental Laboratory (INEEL) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Disposal Facility (ICDF). The request was made because the ICDF waste acceptance criteria allows the disposal of waste with a maximum TRU concentration of 10 nCi/g. The calculations were made both for the waste as it was originally found in the tank and for the waste as it currently resides in the high-integrity container (HIC).

The initial source term calculation was performed based upon the original as-found concentrations for the sludge and liquid in the ARA-16 Radionuclide Tank. Using the volumes from the Record of Decision (DOE-ID 2000) as provided in Section 10.7, the tank contained 17 L (4.5 gal) of sludge and 1,180 L (312 gal) of liquid. As shown in the attached table, the volumes were corrected for density and converted to mass. The individual contaminant concentrations in the liquid and sludge matrices were first converted to total activity present for each matrix then combined to provide a total individual activity for the entire waste form. Radionuclide concentrations for the waste stream were then calculated using the total combined mass of sludge and liquid. Using both the average and maximum concentrations of the radionuclide contaminants, a source term for the waste was determined, whereby, the concentrations were assumed to be homogeneously dispersed throughout the entire waste stream. This provided an average TRU concentration of 1.33 nCi/g with a maximum of 1.58 nCi/g. Given the relatively long half-lives for the TRU contaminants, no correction for decay was made in performing this calculation.

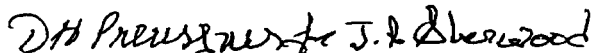
Ms. Kathleen E. Hain
May 29, 2003
CCN 42770
Page 2

For the second source term calculation, the exposure rate measured at contact on the HIC combined with the known maximum sludge contaminant concentrations was used to determine an inferred concentration of the waste as it currently resides in the HIC. MicroShield calculations were performed to compute the exposure rate for the sludge from which the contaminant concentrations were determined. This approach was taken because the actual volumes in the HIC could only be estimated because of the configuration of the HIC. As provided in the attached table, the inferred concentrations for Pu-238, Pu-239/240, and Am-241 are 11.4 nCi/g, 11.7 nCi/g, and 16.6 nCi/g, respectively, yielding a maximum TRU concentration of 39.7 nCi/g for the sludge in the HIC. Because short-lived contaminants play a key role in the MicroShield exposure rate calculations, contaminant concentrations were decay-corrected from those presented in the Record of Decision (DOE-ID 2000).

As can be seen from the data presented, the TRU concentration for the waste as found (1.58 nCi/g maximum) is significantly lower than that determined for the waste as it currently exists in the HIC (39.7 nCi/g). This is attributed to the successful separation and removal of the majority of the liquid that was present in the waste as found in the tank. Given that the ICDF waste acceptance criteria allows waste with a maximum TRU concentration of 10 nCi/g to be disposed, the as-found TRU concentration of the ARA-16 waste stream is well below this criteria. Furthermore, once the ARA-16 waste is treated, the final treated waste form must be stabilized in grout to provide shielding ultimately yielding a final disposal form that is below the 10 nCi/g criteria.

If you have any questions concerning these calculations, please contact me at (208) 526-9369 or Richard P. Wells at (208) 526-2920.

Sincerely,



Julie A. Sherwood, Project Manager
WAGs 2, 4, 5, 6 and 10

RPW:sr

Attachment

cc: (w/o Att.)
S. S. Crawford, INEEL, MS 3810
P. H. Divjak, INEEL, MS 3898
C. A. Hathaway, DOE-ID, MS 1222 (w/Att.)
R. J. Hoyles, DOE-ID, MS 1221
B. D. Shipp, INEEL, MS 3898
S. G. Stiger, INEEL, MS 3898

Ms. Kathleen E. Hain
May 29, 2003
CCN 42770
Page 3

bcc: (w/o Att.)
B. M. Bloom, MS 3940 *CA for BMB*
M. J. Graham, MS 3940
R. P. Wells, MS 3950 *gg*
Correspondence Control, MS 3106
J. A. Sherwood Letter File (JAS-31-03)

(w/Att.)
ARDC Files, MS 3922
WAG 5 Project 23366 File

Uniform File Code: 6102

Disposition Authority: ENV1-h-1

Retention Schedule: Cutoff at submission of the final financial status report for the site, or after resolution of all issues, whichever is later. Destroy 10 years after cutoff with written approval from the EPA award official.

NOTE: Original disposition authority, retention schedule, and Uniform Filing Code applied by the sender may not be appropriate for all recipients. Make adjustments as needed.

Attachment 1
May 29, 2003
CCN 42770
Page 1 through 2, inclusive

Volumes from ROD Section 10.7	Density (g/mL)	Mass (g)	Mass (kg)
Sludge (gal) 4.5	1.185	20185	20.2
Liquid (gal) 312	0.994	1173962	1174.0
		Total:	1194147

Gamma Spec.	<u>LIQUID</u>				<u>SLUDGE</u>			
	<u>pCi/L</u>		<u>Total pCi in Liquid</u>		<u>pCi/g</u>		<u>Total pCi in Sludge</u>	
	Avg	Max	Avg	Max	Avg	Max	Avg	Max
Ag-108m	NA	NA	NA	NA	4.64E+03	6.80E+03	9.37E+07	1.37E+08
Co-60	1.74E+04	1.87E+04	2.05E+07	2.21E+07	2.03E+05	3.20E+05	4.10E+09	6.46E+09
Cs-134	2.05E+05	2.13E+05	2.42E+08	2.52E+08	3.12E+04	3.83E+04	6.30E+08	7.73E+08
Cs-137	5.92E+07	6.09E+07	7.00E+10	7.19E+10	1.13E+07	1.33E+07	2.27E+11	2.68E+11
Eu-152	NA	NA	NA	NA	2.15E+04	2.49E+04	4.33E+08	5.03E+08
Eu-154	NA	NA	NA	NA	5.82E+03	9.08E+03	1.18E+08	1.83E+08
Zn-65	NA	NA	NA	NA	5.50E+03	6.56E+03	1.11E+08	1.32E+08
Alpha Isotopes					0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pu-238	1.02E+03	1.29E+03	1.21E+06	1.52E+06	2.25E+04	2.87E+04	4.55E+08	5.79E+08
Pu-239/240	1.55E+03	2.15E+03	1.83E+06	2.54E+06	2.30E+04	2.80E+04	4.65E+08	5.65E+08
U-234	7.64E+02	7.98E+02	9.02E+05	9.42E+05	3.54E+04	3.89E+04	7.15E+08	7.85E+08
U-235	4.68E+00	4.68E+00	5.53E+03	5.53E+03	NA	0.00E+00	0.00E+00	0.00E+00
U-238	1.56E+01	1.61E+01	1.85E+04	1.90E+04	4.64E+02	4.64E+02	9.37E+06	9.37E+06
Am-241	1.76E+03	1.93E+03	2.08E+06	2.28E+06	3.27E+04	3.64E+04	6.60E+08	7.35E+08
Strontium-90	1.68E+05	1.72E+05	1.99E+08	2.03E+08	5.59E+05	6.38E+05	1.13E+10	1.29E+10
Tritium	2.94E+05	3.01E+05	3.47E+08	3.55E+08	NA	0.00E+00	NA	0.00E+00

Gamma Spec.	<u>AS-FOUND WASTE FORM</u>					
	<u>Total pCi in Tank</u>		<u>pCi/g in Tank</u>		<u>nCi/g in Tank</u>	
	Avg	Max	Avg	Max	Avg	Max
Ag-108m	9.37E+07	1.37E+08	7.84E+01	1.15E+02	7.84E-02	1.15E-01
Co-60	4.12E+09	6.48E+09	3.45E+03	5.43E+03	3.45E+00	5.43E+00
Cs-134	8.72E+08	1.02E+09	7.30E+02	8.58E+02	7.30E-01	8.58E-01
Cs-137	2.97E+11	3.40E+11	2.49E+05	2.85E+05	2.49E+02	2.85E+02
Eu-152	4.33E+08	5.03E+08	3.63E+02	4.21E+02	3.63E-01	4.21E-01
Eu-154	1.18E+08	1.83E+08	9.84E+01	1.53E+02	9.84E-02	1.53E-01
Zn-65	1.11E+08	1.32E+08	9.29E+01	1.11E+02	9.29E-02	1.11E-01
Alpha Isotopes	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pu-238	4.56E+08	5.81E+08	3.82E+02	4.86E+02	3.82E-01	4.86E-01
Pu-239/240	4.67E+08	5.68E+08	3.91E+02	4.75E+02	3.91E-01	4.75E-01
U-234	7.16E+08	7.86E+08	6.00E+02	6.58E+02	6.00E-01	6.58E-01
U-235	5.53E+03	5.53E+03	4.63E-03	4.63E-03	4.63E-06	4.63E-06
U-238	9.38E+06	9.38E+06	7.86E+00	7.86E+00	7.86E-03	7.86E-03
Am-241	6.62E+08	7.37E+08	5.54E+02	6.17E+02	5.54E-01	6.17E-01
Strontium-90	1.15E+10	1.31E+10	9.62E+03	1.10E+04	9.62E+00	1.10E+01
Tritium	NA	3.55E+08	NA	2.98E+02	NA	2.98E-01
TRU Conc.					1.33E+00	1.58E+00

ARA-16 Sludge Waste Source Term

Radionuclide	Concentration (pCi/g)	Normalized Activity	Inferred Concentration (pCi/g)
Ag-108m	4.596E+03	4.658E-04	2.33E+03
Am-241	3.270E+04	3.314E-03	1.66E+04
Co-60	9.545E+04	9.673E-03	4.84E+04
Cs-134	4.545E+03	4.606E-04	2.30E+03
Cs-137	9.868E+06	1.000E+00	5.00E+06
Eu-152	1.600E+04	1.622E-03	8.11E+03
Eu-154	3.666E+03	3.715E-04	1.86E+03
Pu-238	2.253E+04	2.283E-03	1.14E+04
Pu-239/240	2.303E+04	2.334E-03	1.17E+04
Sr-90	4.865E+05	4.930E-02	2.47E+05
U-234	3.543E+04	3.591E-03	1.80E+04
U-235*	2.290E+02	2.321E-05	1.16E+02
U-238*	4.640E+02	4.702E-05	2.35E+02
Zn-65	1.437E+01	1.456E-06	7.29E+00

MicroShield calculations ran to compute the exposure rate for a source of ARA-16 sludge using only the Cs-137 and Co-60 normalized activities. The Cs-137 and Co-60 comprise over 99% of the total exposure rate calculated from earlier modeling efforts.

The calculated exposure rate is 689.5 mR/hr

The exposure rate measured at contact with the HIC is 1.5 R/hr.

Assumptions:

Height of sludge in HIC	25.9 cm
Height of exposure rate measurement	12.95 cm
Volume of sludge in HIC	3.78E+05 cm ³
Density of sludge in HIC	1.15 g/cm ³

Appendix C

Cost Estimate for Remedial Action

Group 2 Remedial Design/Remedial Action Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10 Remedial Action Cost Estimate.

Activity Title	Cost (\$1000s)
Project Management	\$ 296.3
Consolidation System Hardware and Testing (Consolidation Tanks, Tank Transfer and Rinse Equipment, off-gas, and associated testing)	\$ 768.2
Site Preparation	\$ 637.3
Contents Consolidation and Pre-treatment	\$ 90.0
Transfer System Decommissioning and Secondary Waste Management	\$ 702.0
V-Tank and Soil Removal and Site Restoration	\$ 157.1
Sub Total	\$2650.9
Management Reserve 10%	\$ 265.0
Total Cost Estimate for Group 2 Remedial Design/Remedial Action Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10	\$2916.00

Appendix D

Safety Category Evaluation

DOCUMENT MANAGEMENT CONTROL SYSTEM (DMCS) DOCUMENT ACTION REQUEST (DAR)

1. Document ID: LST-77		Current Revision ID: 7		See Block 8 for DAR # Info.	
2. Document Title: TAN OPERATIONS SAFETY CATEGORY LIST					
3. Requester: Gundersen James M		Phone: 526-4172	MS: 9206	E-mail: GUNDJM	S No.: 085276
4. Type: <input checked="" type="checkbox"/> Document <input type="checkbox"/> Drawing		5. Type of action: <input type="checkbox"/> Create <input checked="" type="checkbox"/> Revise <input type="checkbox"/> Cancel			
6. Field Change: <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes If Yes, will the change be: <input type="checkbox"/> Permanent or <input type="checkbox"/> Temporary? If Temporary, enter the field change duration:					
7. Proposed Action:					
Item	Page No./ Section/Zone	Description		Justification	
1	Entire Document	Revise Document.		SAR/TSR Implementation.	
8. Proposal Approval: <input checked="" type="checkbox"/> Accepted <input type="checkbox"/> Deferred <input type="checkbox"/> Rejected					
If rejected, indicate reason: _____					
Document Owner Printed Name: Kevin E. Streeper				Signature: <i>Kevin Streeper</i>	Date: 12-11-03
Is this a minor document change? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes If Yes, proceed to Block 14. (For Operations procedures, go to Block 11.)					
9. Management Approval (Excluding drawings, minor changes, & field changes):					
Printed Name: Kevin E. Streeper				Signature: <i>Kevin Streeper</i>	Date: 12-11-03
10. Implementation Actions – Will the proposal require:					
Hazard mitigation per MCP-3562 or MCP-3571? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes If Yes, _____					
Training? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes If Yes, _____					
Procurement activities? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes If Yes, _____					
Building modifications? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes If Yes, _____					
Other: _____					
11. Include a list of reviewers and review comments and resolutions with this form or have reviewers sign below.					
Printed Name	Discipline	Org. No.	Signature	Date	
I. Stepan/D. Miyasaki	Safety Analysis	3K21	<i>James Gundersen</i>	12/23/03	
J. K. Rider	Quality Assurance	3L25	<i>J. K. Rider</i>	12-23-03	
K. M. Wendt	SSC	3K14	<i>K.M. Wendt</i>	12-23-03	
D. A. Wale/L.T. Evens	Operations	3C70	<i>Darryl Evens</i>	12-23-03	
12. Is document a TPR or EAR? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes If Yes, indicate procedure validation method used:					
<input type="checkbox"/> Formal Walkdown <input type="checkbox"/> Tabletop Analysis <input type="checkbox"/> Limited Trial Use/Field Use <input type="checkbox"/> Partial Validation					
13. <input checked="" type="checkbox"/> Change does not affect a permitted area, TSD facility, or VCO component. (RCRA evaluation NOT required. Proceed to Block 14.)					
<input type="checkbox"/> Change does affect a permitted area, TSD facility, or VCO component.					
Is RCRA permit/application modified: <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Unknown					
If Yes or Unknown, attach completed Form 435.29 or reference form's location here: _____					
Evaluator Printed Name		Evaluator Signature		Date	
Is VCO component affected? <input type="checkbox"/> No <input type="checkbox"/> Yes If Yes, contact the VCO Program Office for direction.					
14. USQ Screening: (To be completed only after final document review.) List any associated change forms: _____					
<input checked="" type="checkbox"/> Not Required (Proceed to Block 15) Exempt per PRD-113 for SAR-208 Implementation.					
<input type="checkbox"/> Required (Submit document and DAR to qualified USQ screener and attach USQ screening form.)					
<input type="checkbox"/> USQ Evaluation Required? <input type="checkbox"/> No <input type="checkbox"/> Yes If Yes, attach evaluation.					
15. Does this action qualify as a periodic review? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> N/A					

412.11
09/12/2002
Rev. 09

DOCUMENT MANAGEMENT CONTROL SYSTEM (DMCS) DOCUMENT ACTION REQUEST (DAR)

1. Document ID: LST-77		Current Revision ID: 7	See Block 8 for DAR # Info.
16. Desired effective date for document: 1/1/05 12/22/03 NA. 1/6/04			
17. Other documents affected by this action: none			
18. Document Owner Final Approval: (Changes in addition to those identified on this DAR, if applicable, have been approved during the review process. See document case file for the record of changes.) Approval signifies implementation actions are complete or document is ready as a pending document.			
Kevin E. Streeper		12/23/03	
Document Owner Printed Name		Document Owner Signature	Date
19. Drawing Checker Approval & Date:	20. Document Control Release & Date		21. Document Control Location:
	Jana M Scott 1-08-04		TAN-607, Rm. 124
22. Comments:		23. New Revision ID: 8	

MCH
1-7-04

414.70
04/18/2001
Rev. 04

SAFETY CATEGORY LIST

Facility/Program/Project: Test Area North Operations

Life-Cycle Phase: Active

Facility Hazard Category/Class: 2

Safety Category List Rev. # LST-77 new revision 8

Prepared by: James Gundersen 12/22/03
SSC System Engineer Date

Concur: amadeo Ramos James Anderson PTC 12/23/03
Safety Analysis Supervisor Date

Approved by: Douglas A. Wale 12/23/03
Facility/Project Manager Date

Structure/System/Component Identification	Safety Category (SC, SS, LSC)	Source: (SAR, ASA, BIO, etc.)
There are no Safety Class Systems at TAN	SC	TAN SAR-208, Section 4.3.
CASTOR V/21 Cask and Fuel Bucket	SS	TAN SAR-208, Chapter 4 all of Section 4.4.1. No SAR Credit Taken.
The Stainless Steel Secondary Lid is a sub-component of the CASTOR V/21 Cask.	CG	
TN-24P Cask	SS	TAN SAR-208, Chapter 4 all of Section 4.4.2. No SAR Credit Taken.
The Protective Weather Cover is a sub-component of the TN-24P Cask	CG	
TN-24P Cask Fuel Basket	SS	TAN SAR-208, Chapter 4 all of Section 4.4.3.
Westinghouse MC-10 Cask	SS	TAN SAR-208, Chapter 4 all of Section 4.4.4. No SAR Credit Taken.
The Lid Lifting Fixture, <i>Reference Dwgs 421825, 421859 and 427582 built as quality level B</i> , is a sub-component of the Westinghouse MC-10 Cask.	CG	
VSC-17 Cask and Fuel Basket, including Cask Weather Cover.	SS	TAN SAR-208, Chapter 4 all of Section 4.4.5. No SAR Credit Taken.
The Lifting Fixture, <i>Reference Dwg 432391</i> , is a sub-component of VSC-17 Cask	CG	
REA-2023 Cask	SS	TAN SAR-208, Chapter 4 all of Section 4.4.6. No SAR Credit Taken.
The Lifting Device Assembly, <i>Reference Dwg 516780</i> , is a sub-component of the REA-2023 Cask.	CG	
REA-2023 Cask Insert	SS	TAN SAR-208, Chapter 4 all of Section 4.4.7. No SAR Credit Taken.
The Cask Insert Spreader Bar, <i>Reference Dwg 519477 built as LSC</i> , is a sub-component of the REA-2023 Cask Insert.	CG	
FP-2 Containers	SS	TAN SAR-208, Chapter 4 all of Section 4.4.8.
REA-2023 Overpacks	SS	TAN SAR-208, Chapter 4 all of Section 4.4.9.
Spent Fuel Cask Transporter	SS	TAN SAR-208, Chapter 4 all of Section 4.4.10. No SAR Credit Taken.
The Wheels, Hydraulics System, Air Systems, Steering System, Electrical Controls, and Cask Lift Links are sub-components of Spent Fuel Cask Transporter.	CG	
Hot Shop/Hot Cell Shielding (Walls, Windows, Penetrations, and	SS	TAN SAR-208, Chapter 4 all

414.70
04/18/2001
Rev. 04

SAFETY CATEGORY LIST

Doors) There are no Low Safety Consequence Systems at TAN.	LSC	of Section 4.4.11. Table 3-12 "TANO Hazard Analysis Results". No SAR Credit Taken.
All other SSC's are Consumer Grade and are not identified on this list.	CG	

414.02
04/18/2001
Rev. 04

SAFETY CATEGORY DESIGNATION AND RECORD

Safety Category Evaluation Performed By: James Gundersen Date: 12/22/03

Facility/Structure/System/Component: Test Area North Operations Hazard Category: 2

IDENTIFICATION OF ITEM	SAFETY CATEGORY DESIGNATION	TECHNICAL JUSTIFICATION
There are no Safety Class Systems at TAN	SC	TAN SAR-208, Section 4.3.
CASTOR V/21 Cask and Fuel Bucket	SS	TAN SAR-208, Chapter 4 all of Section 4.4.1.
The Stainless Steel Secondary Lid is a sub-component of the CASTOR V/21 Cask.	CG	No SAR Credit Taken.
TN-24P Cask	SS	TAN SAR-208, Chapter 4 all of Section 4.4.2.
The Protective Weather Cover is a sub-component of the TN-24P Cask	CG	No SAR Credit Taken.
TN-24P Cask Fuel Basket	SS	TAN SAR-208, Chapter 4 all of Section 4.4.3.
Westinghouse MC-10 Cask	SS	TAN SAR-208, Chapter 4 all of Section 4.4.4.
The Lid Lifting Fixture, <i>Reference Dwgs 421825, 421859 and 427582 built as quality level B</i> , is a sub-component of the Westinghouse MC-10 Cask.	CG	No SAR Credit Taken.
VSC-17 Cask and Fuel Basket, including Cask Weather Cover.	SS	TAN SAR-208, Chapter 4 all of Section 4.4.5.
The Lifting Fixture, <i>Reference Dwg 432391</i> , is a sub-component of VSC-17 Cask.	CG	No SAR Credit Taken.
REA-2023 Cask	SS	TAN SAR-208, Chapter 4 all of Section 4.4.6.
The Lifting Device Assembly, <i>Reference Dwg 516780</i> , is a sub-component of the REA-2023 Cask.	CG	No SAR Credit Taken.
REA-2023 Cask Insert	SS	TAN SAR-208, Chapter 4 all of Section 4.4.7.
The Cask Insert Spreader Bar, <i>Reference Dwg 519477 built as LSC</i> , is a sub-component of the REA-2023 Cask Insert.	CG	No SAR Credit Taken.
FP-2 Containers	SS	TAN SAR-208, Chapter 4 all of Section 4.4.8.
REA-2023 Overpacks	SS	TAN SAR-208, Chapter 4 all of Section 4.4.9.
Spent Fuel Cask Transporter	SS	TAN SAR-208, Chapter 4 all of Section 4.4.10.
The Wheels, Hydraulics System, Air Systems, Steering System, Electrical Controls, and Cask Lift Links are sub-components of Spent Fuel Cask Transporter.	CG	No SAR Credit Taken.
Hot Shop/Hot Cell Shielding (Walls, Windows, Penetrations, and Doors)	SS	TAN SAR-208, Chapter 4 all of Section 4.4.11.
There are no Low Safety Consequence Systems at TAN.	LSC	Table 3-12 "TANO Hazard Analysis Results".

414.02
04/18/2001
Rev. 04

SAFETY CATEGORY DESIGNATION AND RECORD

All other SSC's are Consumer Grade and are not identified on this list.	CG	No SAR Credit Taken.

Note: Identify and record safety category in accordance with MCP-540, and obtain appropriate approvals. Completed and approved form becomes a part of the safety basis documentation.

<u>Amador Ramus</u> Safety Analysis Supervisor Concurrence Printed/Typed Name	<u><i>Amador Ramus</i></u> <i>ptc Amador Ramus</i> Safety Analysis Supervisor Concurrence Signature	<u>12/23/03</u> Date
<u>Douglas A. Wale</u> Facility/Program/Project Approval Printed/Typed Name	<u><i>D. A. Wale</i></u> Facility/Program/Project Approval Signature	<u>12/23/03</u> Date

- SSC Structure, system, or component.
 - SC Safety Class—for structures, systems, or components (SSC), having the highest potential safety consequence.
 - SS Safety Significant—for SSCs having moderate potential safety consequence.
 - LSC Low Safety Consequence—for SSCs having low potential safety consequence.
 - CG Consumer Grade—for SSCs not identified in the above safety categories
- Definitions provided in MCP-540

Appendix E

Agency Comment Resolution Forms

RD/RA Work Plan Comments

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** DOE

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
GENERAL COMMENTS				
1	N/A	N/A	Relocate the consolidation tanks from the Hot Shop to area north of TAN-666. Provide a weather enclosure over the consolidation tank skid. Equipment layout drawings will be impacted, but the process is not affected by this change. This relocation may eliminate the need for the tank support skid (DWG S-3) which would also impact the associated EDF (calculations). The following drawings are impacted: C-1, P-1, P-3 – P-8, E-1 – E-3, E-13. This will also impact SPC-555 requiring additional specifications for the enclosure and associated pad (e.g. compaction requirements).	Incorporated. EDF-5071 addresses the tank support skid and secondary containment issues. SPC-555 has been revised.
2	N/A	N/A	a. Modify the off-gas system to address use of the sparging system to remove VOCs that would be corrosive to the chemical oxidation reaction vessel. The VOCs will be captured on a granular activated carbon filter, which will be treated and disposed of off-site. b. The major change to the existing design will be the addition of a condenser and preheater upstream of the filters to avoid condensation. The following drawings are impacted: P-1 – P-3. This will also impact SPC-555 and associated EDFs (calculations) requiring sizing of GAC filters, blower size, etc.	Incorporated.
3	N/A	N/A	Provide design for transporting and disposing of the empty V-tanks into the ICDF landfill. This was omitted from the original design and needs included to ensure the tanks are properly transported, placed and the void volume filled in the landfill. Additional specifications and calculations may be required.	Comment noted. Section 6.2.16 and the Waste Management Plan address the disposal of the V-Tanks at the ICDF. Perhaps the commentor meant the Consolidation Tanks rather than the V-Tanks; disposal of the Consolidation Tanks will be addressed in Addendum 3.

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** DOE

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
SPECIFIC COMMENTS				
1	DWG P-1	N/A	Replace pump P-1 with an electric pump (vs. air driven). An existing electric pump used on ARA-16 tank was located and will be used. Associated specifications and calculations will be modified.	Incorporated.
2	DWG P-1 & P-2	N/A	Provide double isolation on all connections/lines which could release waste (e.g. sample and drain lines).	Incorporated. Double walled lines are provided between P1 and the Consolidation Tank containment pan.
3	DWG P-2	N/A	Provide recirculation capability for each tank individually. Necessary to allow continued recirculation while another tank is transferring waste to the treatment process.	Incorporated.
4	DWG C-11	N/A	Modify the tank lay-down area to avoid interference with the excavation.	Incorporated. See Drawing C-14
5	DWG P-10	N/A	Add handrail to top of tanks to allow access for maintenance. SPC-555 will be modified accordingly.	Not incorporated. Will be done as a field modification.
6	DWG P-10	N/A	Change tank pressure to -5" W.C. and + 5 PSIG. This will allow more operating flexibility since it is desired to maintain a vacuum on the tanks relative to atmospheric.	Incorporated.
7	DWG P-6	N/A	Correct drawing to reflect soil level at top of V-9. This will also require additional shielding above tank to protect workers.	Incorporated. The need for shielding is noted on the drawing. Shielding will be installed in the field in accordance with Radiation Control personnel direction.

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** DOE

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
8	DWG P-10	N/A	Change wall thickness to “nominal 3/8”, change tank material to 304L “(or equivalent)” and change tank support to 4 legs “(or equivalent).” This allows tank designers/fabricators additional flexibility to allow expediting tank delivery.	Wall thickness changed to nominal 3/8”. Changed tank material to 304L SST. Did not change to 4 legs or equivalent. Tanks are being fabricated with 4 legs.
9	DWG C-2 & C-9	N/A	Modify the soil pile to a more consolidated pile and place it closer to the V-tanks area. This will reduce the travel distance and the amount of native soil under the pile that must be removed and transported to ICDF.	Incorporated: Soil pile was moved closer. Comment noted: After several discussions with TAN Operations, and others, the optimum location was selected and is shown on the revised drawings. The soil pile was moved to the east.
10	6.2.4	52	Add a discussion regarding the protocol for addressing the discovery of leaks in pipes, valves, or tanks.	Incorporated. A new section (6.2.5) has been inserted to incorporate similar language to that used in the PM-2A Tanks Addendum [1].

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** DOE

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
1	5.3	5-5	Storage of PCB bulk product and PCB remediation waste needs to be addressed by an ARAR	<p>Comment Noted. A new ARAR is not necessary, but the issue has been addressed by adding the June 19, 2002, EPA letter approving alternative storage requirements for PCB bulk product waste as a To Be Considered (TBC). This alternative storage approach for non-liquid PCB waste was based on 40 CFR 761.65(c)(9) as amended by a risk based petition under 40 CFR 761.61(c) and 40 CFR 761.62(c). This new requirement has been identified by adding a new third paragraph right after the bullets in Section 1.0.</p> <p>“During the development of this workplan addendum, waste was identified that requires management as PCB bulk product waste under the Toxic Substances Control Act. Therefore the alternative storage requirements approved by EPA on June 19, 2002, for this non-liquid PCB wastes has been added as a requirement. Storage under these alternative storage requirements shall be limited to 180 days unless sufficient rationale is provided to extend that time.”</p> <p>This requirement is also be discussed in the ARAR compliance table (Table A-1). The following text was added to Table A-1.</p> <p>Waste contaminated with PCB Bulk Product Waste or PCB Remediation Waste will be stored in a CERCLA waste storage area in compliance with the requirements of the EPA Risk Based Approval dated June 19, 2002. These wastes will be stored in CERCLA waste storage areas as necessary to support remedial activities and ultimate disposal under this workplan. Storage under these alternative storage requirements shall be limited to 180 days unless sufficient rationale is provided to extend that time</p>

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** DOE

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
----------------	-------------------	----------------	---------	------------



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** DEQ

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
----------------	-------------------	----------------	---------	------------

GENERAL COMMENTS

1	N/A	N/A	There are many references throughout the document referring to the utilization of puck sampling to confirm wide area screen samples. If this is no longer the case, then the reference to puck sampling should be removed.	Incorporated. Reliance on puck samples is now limited to the case where field shine inhibits accurate wide-area screen. Revisions made to Section 6.2.11 and 6.2.12. Revision of Figure 6 has been incorporated.
2	N/A	N/A	It is not clear as to exactly what areas are to be revegetated. The V-Tanks area is not to be revegetated; however the soil staging area north of the V-Tanks is to be revegetated. The excavated areas in Drawings C-3 and C-5 are scheduled for gravel only and are not to be revegetated. Please state whether the proposed treatment area that is currently under construction is scheduled for revegetation.	Please see response to EPA General Comment No 1.

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** DOE

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
SPECIFIC COMMENTS				
1	1.2.1	8	Page 8, Section 1.2.1, first paragraph, first sentence. Since the text within this document addresses such items as valve pits 1 and 2, please include at least a general notation/indicator in the figure of the former locations of TSF-21 and TDF-1704	Incorporated into Figure 2.
2	1.2.1.1	10	Page 10, Section 1.2.1.1, third paragraph. To state "Liquid level measurements in Tanks V-1 and V-2 have remained relatively constant (DOE-ID 1997)." while citing a reference that is out-of-date seems contradictory. Please reference information that cites levels for Tanks V-1 and V-2 through as recent a date as possible.	Incorporated: Reference to EDF-3067 was added. That EDF, written in 2001, discusses the variations in the level and attributes the minor variations to line condensation.
3	1.2.1.1, Table 3	10	Page 10, Section 1.2.1.1, fourth paragraph and table 3. The original liquid levels (pre RI/FS) in the table should be included in order to show how much the liquid level has increased.	Comment noted: The RI/FS reference cited was used as one source of information to estimate the current tank content volume. The conceptual design report (INEEL 2003b) used up-to-date level indications to calculate the volume. EDF-3067 (which was added as a reference to Addendum 2) shows the levels from April 1996 to October 2001. Information regarding the levels prior to 1996 would provide no useful information to the remedial design or remedial action.
4	1.2.1.3	12	Page 12, Section 1.2.1.3, second paragraph, third sentence. If the excavated depth of this remedial action cleanup of the surface spill is known, please include this information within this paragraph.	Comment noted. The depth of excavation is not known, No change to the Addendum was made.

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** DOE

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
5	1.3	13	Page 13, Section 1.3, second paragraph, second bullet. This is the first instance of the mention of the inclusion of the waste generated from the ARA-16 remediation into the consolidation tanks. Please footnote this entry and/or reference Section 4.3.11.	<p>Incorporated. Four miscellaneous waste items will be consolidated into the V-Tank Waste. Those items are:</p> <ul style="list-style-type: none"> Returned samples from previous V-Tank sampling events Sludge from the OU 1-07B remediation Liquid that was in lines between Tank V-9 and tanks V-1, V-2, and V-3 <p>ARA-16 sludge and water (80 gallons).</p> <p>Section 1.2 has been amended to add the text above and a cross-reference to Section 4.3.11 was added. Section 4.3.12 has been revised extensively to describe the miscellaneous waste and the design for introducing the waste to the consolidation tanks. Section 6.2.11.7 was also modified.</p> <p>Characterization data for the miscellaneous waste is provided in EDF-4928, which is included in Attachment 3.</p>
6	Ibid	13	Page 13, Ibid., second paragraph, sixth bullet. As referenced in the previous comment, an additional footnote that describes what is meant by the term, “surface soil” may be beneficial to the reader in this early portion of the document. Please consider the addition.	Incorporated. The term “surface” was deleted.

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** DOE

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
7	Table 4	21	Page 21, Table 4, Remedy Component 11(c). Please consider adding a footnote at the end of the table that references the location of the list of V-tank contaminants that would be analyzed for to support the stated risk analysis.	Incorporated. Fourth bullet was amended to add: “The targeted constituents are discussed in the Field Sampling Plan associated with this Addendum 2 (ICP 2004a).”
8	Table 4	23	Page 23, Table 4, Item 13, Implementation Approach, Second Bullet. Physical barriers are sometimes considered part of Institutional Controls and in some cases they may not be included. Recommend last sentence to state “Institutional and <u>engineering</u> controls could include deed restrictions, signing and posting, and if necessary, fencing.	Incorporate. “engineering” was added as requested.
9	2.3.3	25	Page 25, Section 2.3.3. This compilation of documents providing INEEL project-specific requirements applicable to implementation of the V-Tanks remediation should be compared to the documents discussed on pages 1 and 2 (Section 1). It appears that “DOE-ID 2003b” should be added to the list.	Comment noted. However, the cited document does not contain requirements applicable to this Addendum that are not already carried forth.
10	Table 5	32	Page 32, Table 5, second row. Please briefly explain the “Mitigative Action” for Tank V-9, listed as “macroencapsulation”.	Incorporated. The following sentence was added. “Macroencapsulation involves grouting the interior and exterior surfaces of the tank.”

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** DOE

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
11	Table 5	32	Page 32, table 5, last row. The first entry in the “Mitigative Action” column references a thorough review of previous data that provides a level of confidence that the site has been adequately characterized. This appears contradictory to the statement in the “Uncertainty” column, which seems to indicate additional contaminants have been discovered regardless of the review of previous data. Please explain.	Incorporated. We believe the site to be well characterized, however, there remains an unquantifiably possibility that additional contaminants, either Cs-137 or RCRA contaminants, could be found. You are correct that, as written, the statement implied that additional contaminants have actually been found; this is not the case. To clarify, the uncertainty statement was revised to read : “Additional contaminants might be found that contribute to the FRGs.”
12	4.2	34	Page 34, section 4.2, eighth bullet. Please explain the significance relative to design of the tanks sloping towards the sumps to allow for the collection of water and sludge in the slumps. How is this assumption relevant?	Incorporated. Good catch. The need for this assumption is no longer valid and the assumption has been removed.
13	4.3.2.3	36	Page 36, section 4.3.2.3, second paragraph, third sentence. Drawing C-10, referenced in this section, would greatly benefit from the addition of “ghost” outlines of the locations of the V-tanks and soil stockpile areas. Please consider the addition.	Comment noted: Drawing C-10 is the final grading plan, i.e., after V-Tank removal. Because the V-Tanks will have been removed, their indication on this drawing is not needed.
14	4.3.2.4	37	Page 37, section 4.3.2.4, second sentence. The referenced drawing should be Drawing C-18 and not C-12.	Incorporated. Drawing references have been corrected.
15	4.3.2.6	37	Page 37, section 4.3.2.6, first paragraph, fourth sentence. Trucks transporting contaminated soil waste should be covered at all times when in transit. Please provide the justification when this is stated, “as needed”.	Incorporated. An alternative is now being proposed in which soil bags would be used instead. However, if the bulk soil storage is used, the trucks would be covered. Trucks carrying soil bags would not be tarped. See revised Section 4.3.2.6.

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** DOE

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
16	4.3.2.7	37	Page 37, section 4.3.2.7, first paragraph. Drawing C-4 shows the berm base dimension as 2 ft 0 in., not 2 ft 9 in. as stated in the text. Please compare and modify.	Incorporated. The drawing dimensions prevail.
17	4.3.11	41	Page 41, section 4.3.11, second and third paragraph. Table H-1 in Appendix H contains chemical and radiological characteristics of ARA-16 tank sludge waste from sampling in 1997. There is also a statement in the second paragraph of Section 4.3.11 that states the contents of the tank are RCRA-F listed but are not transuranic wastes (>100 nCi/g). The average concentration of the TRU over the entire tank contents before it was placed in the HIC was less than 10 nCi/g, and this is the only information that should be presented. This allowed the ARA-16 waste to be declared eligible for ICDF disposal.	Incorporated The radionuclide data for ARA-16 waste and the other miscellaneous waste is given in EDF-4928, which is in Attachment 3. Appendix B contains the documentation that shows the waste is less than 10 nCi/g and thus acceptable to the ICDF with regards to TRU content.. An introductory sentence has been added to clarify that the data presented is the "as-found" condition.
18	6.2.3	52	Page 52, section 6.2.3, third paragraph, second bullet. Please consider adding "compaction" to this bullet (soil grading and <i>compaction</i>) when discussing the equipment stability goal.	Incorporated.
19	6.2.5	53	Page 53, section 6.2.5, fourth paragraph, fourth sentence. Please change the absolute of "eliminate" to the more realistic "reduce" or "greatly reduce."	Incorporated. Reduced was used.

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** DOE

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
20	6.2.10.6	59	Page 59, section 6.2.10.6, first paragraph, third sentence. Please offer additional text that further describes how this rigging will be installed under the tank(s) if contaminated soils are determined to be present under the tanks	<p>Comment noted.</p> <p>At this point in the remediation, the sludge will have been removed from the tank, thus removing the source term. There is no evidence to suggest that the soil surrounding the tanks is highly contaminated; therefore, the radiation exposure during installation of the rigging is expected to be within acceptable radiation control limits.</p> <p>Work control documents, including a radiation work permit, will be developed that will address the various safety hazards associated with rigging installation. If highly contaminated soil is discovered, it would be removed using the mechanical excavators; the excavation footprint could be enlarged. No change to the RD/RA WP was made.</p>
21	6.2.12	62	Page 62, section 6.2.12, second paragraph, last sentence. It appears the last part of this sentence was inadvertently cut off. Please check.	Incorporated. The following was added: "...excavation would not jeopardize building foundations."
22	6.5.1	69	Page 69, section 6.5.1, second paragraph. It appears the first part of this paragraph was inadvertently cut off. Please check.	Incorporated. Reference to Figure 6 was added.

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** DOE

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
23a	Appendix A	General	Appendix A, Applicable or Relevant and Appropriate Requirements Implementation. IDAPA 58.01.05.008 [40 CFR §264.171] requires that if a container holding hazardous waste is not in good condition or if it begins to leak, the owner or operator must transfer the hazardous waste from this container to a container that is in good condition or manage the waste in some other way that complies with 40 CFR 264. Table A-1 does not specify actions that will be taken if a leaking container (such as the consolidation tanks) is discovered.	Incorporated. The consolidation tanks are “tanks” and not “containers, therefore, 40 CFR 264.171 does not apply to the consolidation tanks. Currently, we do not anticipate the use of “containers” for the consolidation effort. However, as part of normal operations at Test Area North, Overpack containers will be maintained in storage it becomes necessary to overpack a container found not to be in good condition or leaking. This container requirement becomes important for Addendum 3 because the grouted waste is place into High Integrity Containers (HICs). This issue will be addressed in Addendum 3. The aforementioned text has been added to the citation for 264.171 in Appendix A.
23b	Appendix A	General	IDAPA 58.01.05.008 [40 CFR §264.195] requires tanks to be inspected daily. Table A-2 states that the work plan will provide for inspections, but doesn’t specify a frequency. Beyond the obvious observations of the tank during remediation, please indicate if there will be scheduled inspections of the consolidation tanks during the period they will be involved in holding and treating V-tanks wastes.	Incorporated. Daily inspections have been incorporated. See Item 152.

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** DOE

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
23c	Appendix A	General	According to IDAPA 58.01.05.008 [40 CFR §264.554(d)(ii)], a staging pile must be designed so as to prevent or minimize releases of hazardous wastes and hazardous constituents into the environment, and minimize or adequately control cross-media transfer, as necessary to protect human health and the environment (for example, through the use of liners, covers, run-off/run-on controls, as appropriate). Placing a cover over the staging pile will prevent windblown contamination and protect the staging pile from rain and other weather. If this is deemed not necessary due to the temporary nature of the soil piles, please discuss.	Incorporated. The following text was added to the compliance strategy for the 264.554 citation: "The staging pile will be covered with an HPDE tarp when not in use. Sandbags will be used to secure the tarps. Alternatively, soil bags may be used instead of bulk soil staging piles. If soil bags are used, the bags will be closed and sealed but not covered."
24	Appendix G	G-3	Page G-3, Appendix G. Macroencapsulation of V-9 has not been described in detail, and Figure G-1 provides only minimal details as to the specifics of encapsulation of V-9 if necessary (due to incomplete removal of the contents). This could probably be better treated as a contingent remedy and described in detail, with the appropriate figures, when the need arises.	Comment noted: Macroencapsulation is a contingent measure. If macroencapsulation is needed, we will develop work control documents to address the revised approach. Those documents will be available to the Agencies upon request.
25	DWG C-2		Drawing Sheet C-2, Site Plan. For the sake of clarity and relative positioning of target units, please add labels and arrows to the two other sites, namely "Sites 1 and 2", similar to what was provided on Sheet C-6. Also, please label the dotted line just east of the future soil stockpile area.	Incorporated. Labels were added for Sites 1 and 2 and the dotted line.

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** DOE

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
26	DWG C-3		<p>Drawing Sheet C-3, Pump Access Excavation Plan-Phase One.</p> <p>Please examine the label that designates the approximate limit of “previous excavation” of the TAN-616 demolition since the boundary appears to be the wrong reference (top of sheet the same line is indicated as the Phase One excavation limit. Also, the boundaries of the TAN-616 excavation are difficult to discern on this sheet; please clarify.</p>	Comment noted. The west-side of the V-Tank excavation is intended to be the same as the TAN-616 excavation limit. The north end of the V-Tank excavation is properly located. Both the north boundary and the west boundary represent the top edge of the V-Tank excavation. No change to the drawing is needed.
27	DWG C-6		<p>Drawing Sheet C-6, Soil Remediation Excavation Plan-Phase Three.</p> <p>It is assumed that the estimated cubic yards presented on this Sheet include the soil materials destined to be removed from Sites 1 and 2. Please indicate whether this assumption is correct.</p>	Comment noted. These figures represent the total quantities for each phase of the excavation. The figures should be taken at face value. No action required.
28	DWG C-8		<p>Drawing Sheet C-8, Sections and Details.</p> <p>For the cross-section cutaway of F/C-4, please indicate what the crosshatched area represents as there is no label.</p>	Incorporated. Added a general legend at the front of the drawing package that clarifies.
29	DWG C-11		<p>Drawing Sheet C-11, Existing Grade Plan.</p> <p>It would be helpful to provide additional information in the title block of what this sheet specifically represents; “consolidation tank area”, etc.</p>	Comment noted. Sheet C-1 provides this information. Sheet C-1 refers to this sheet. No action required.

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** DOE

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
30	DWG C-12		Drawing Sheet C-12, Finished Grade Plan. Same comment as above for Sheet C-11.	Comment noted. Sheet C-1 provides this information. Sheet C-1 refers to this sheet. No action required.
31	DWG C-15		Drawing Sheet C-15, Tank Removal Option 1-Tank Rigging Plan; Staging Area to Transporter. The crane location pad shown on this Sheet is 30'x 40' and appears, when compared to Sheet C-14, to be a different pad since it lines up to be further north than the pad in the excavation to staging pad scenario. Please provide clarification if this is so or if the pad is merely an extension northward of the C-14 feature.	Comment noted. There are two different crane pads for two different events. The crane location shown in Drawing C-14 is for removal of the tanks from the ground to the tank staging area. The location shown in Drawing C-15 is for loading the tanks from the storage area to the transport trucks. These two events may occur several months apart; during that time, the crane will be returned to its owner. During the Agency meeting of 9/08/04, it was suggested to load the V-Tanks directly to a transporter and to show this option on Drawing C-14. However, unbeknownst to the meeting participants, this scenario is already shown on Drawing C-16. No further change to the drawings was made.
32	DWG P-3		Drawing Sheet P-3, V-Tanks Contents Remediation- Site Plan. Please also provide label for Tank V-9.	Incorporated. Label provided.

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** DOE

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
33	EDF4672 Sec 1	3	<p>TSF-9/18 V-Tanks Contents Removal and Site Remediation, Site Work Design; July 12, 2004- INEEL EDF-4672 (Agency Review Copy) Section 1, second paragraph, third bullet, page 3 of 7.</p> <p>Please modify this reference for the location of the consolidation tanks from TAN-607 to the new location.</p>	Incorporated. References to work done inside of the TAN-607 Hot Shop have been removed.
34	EDF-4672 Sec 2	4	<p>TSF-9/18 V-Tanks Contents Removal and Site Remediation, Site Work Design; July 12, 2004- INEEL EDF-4672 (Agency Review Copy) Section 2, (second paragraph), (phase 1), (page 4 of 7).</p> <p>Please modify this reference for the location of the consolidation tanks from TAN-607 to the new location.</p>	Incorporated. References to work done inside of the TAN-607 Hot Shop have been removed.
35	EDF-4672 Sec 3	4	<p>TSF-9/18 V-Tanks Contents Removal and Site Remediation, Site Work Design; July 12, 2004- INEEL EDF-4672 (Agency Review Copy) Section 3, first paragraph, last sentence, page 4 of 7.</p> <p>Please modify this reference for the location of the consolidation tanks from TAN-607 to the new location.</p>	Incorporated. Incorporated. References to work done inside of the TAN-607 Hot Shop have been removed.

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** DOE

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
36	EDF-4672 Sec 3	5	<p>TSF-9/18 V-Tanks Contents Removal and Site Remediation, Site Work Design; July 12, 2004- INEEL EDF-4672 (Agency Review Copy) Section 3, (tenth paragraph), (third sentence), (page 5 of 7).</p> <p>Please modify the reference from the stated C-11 and C-12 drawings to the latest edition labeled, C-14 and C-15.</p>	Incorporated. Reference made to the proper drawings, C-14 through C-16.
37	EDF-4602 Sec 2	8	<p>TSF-9/18 V-Tanks Contents Removal and Site Remediation, June 2, 2004- INEEL EDF-4602 Section 2, second paragraph, third sentence, page 8 of 117.</p> <p>Please modify this reference for the location of the consolidation tanks from TAN-607 to the new location.</p>	Incorporated. Incorporated. References to work done inside of the TAN-607 Hot Shop have been removed.
38	EDF-4602 Sec 4	14	<p>TSF-9/18 V-Tanks Contents Removal and Site Remediation, June 2, 2004- INEEL EDF-4602 Section 4, (fifth bullet), (page 14 of 117).</p> <p>Please modify this reference for the location of the consolidation tanks from TAN-607 to the new location.</p>	Incorporated. Incorporated. References to work done inside of the TAN-607 Hot Shop have been removed.

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** DOE

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
39	EDF-4956 Sec 5.3	9	<p>Off-Gas Design System, Sparge, TSF-9/18 V-Tanks Contents Removal and Site Remediation, July 12, 2004 INEEL EDF-4956 Section 5.3, first paragraph, first sentence, page 9 of 61.</p> <p>In reviewing the RD/RA Work Plan, the step-wise strategy for the V-Tanks Contents phase was to first remove the supernatant off of V-3 in order to reutilize the liquid for flushing sludge out of the V-1 through 3 tanks. This section does not appear to address this first step. Please explain and/or modify as appropriate.</p>	Incorporated. Added words to step 1 of the conceptual model to state that V-3 will be used for this. See Section 4.3.1 of revised EDF-4956.
40	EDF-4956 Sec 5.3	10	<p>Off-Gas Design System, Sparge, TSF-9/18 V-Tanks Contents Removal and Site Remediation, July 12, 2004 INEEL EDF-4956 Section 5.3, (fourth paragraph), (last sentence), (page 10 of 61).</p> <p>The reference her to the Flanders Filter unit does not appear to comport with the other references (in other EDFs) of the Calgon Vent-Sorb systems. Please explain whether this was the earlier version of the intended carbon bed and the Calgon system was later incorporated or an alternate explanation.</p>	Incorporated. EDF-4956 has been scrubbed to address Flanders only

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
GENERAL COMMENTS				
1	General		EPA is not convinced that backfilling the excavation(s) with gravel instead of clean fill dirt is the appropriate action. Soil provides a better infiltration barrier, particularly after the area has been revegetated, than gravel and also provides a better habitat for animals. Since there is currently no long term use planned for TAN it is more appropriate to return the site(s) to a more natural state.	<p>Incorporated. The backfill material will be obtained from the TAN borrow pit. The term “pit-run gravel” carries a connotation that the material is mostly stone, when in fact it contains copious amounts of fines and soil that is well suited for compaction in accordance with the construction specification, SPC-555. The compacted backfill material will result in a low-permeability (but not impervious) area. To remedy this confusion, the term “pit-run gravel” (and various other nomenclatures) have been globally replaced with the term “pit run material”. A definition of this material is provided in 2.4.1.8. and a clarification of the rational for not reseeding was added to Section 2.4.1.8, 4.1, 4.3.10, 6.2.15.</p> <p>In contrast to the draft (Revision C) version, the project is proposing that the remediated areas in the industrial area surrounding TAN 607 would not be revegetated. This area includes TSF-09, 18, 21, 26 and TSF-06 Area B. SPC-555, the construction drawings, and Section 6.2.15, and the pre-final inspection discussion in 6.3.1 have been revised accordingly In addition, the following statement was added to Section 8: “In addition, the five year review will include inspection for the presence of noxious weeds and, if necessary, their removal.”</p> <p>Section regarding 6.5.6 regarding operations and maintenance was revised to reflect no reseeding but that inspection for noxious weeds was needed.</p>

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
2a	General		<p>It appears that little thought was given to design of the waste pretreatment sparging and design of the off-gas system. Previous discussions indicated that air sparging was to be just a pretreatment for VOCs but text in the EDF indicates that removal of 99% of the VOCs is to be achieved. Is air sparging the main treatment technology for VOCs?</p> <p>Pretreatment of the waste utilizing air sparging is addressed as part of this addendum. Sparse information on pre-treatment of the waste and the off-gas system is provided in Section 4.2, the Design Assumptions, and Section 4.3, the Detailed Design Description. No information on waste pretreatment or the off-gas system is provided in Section 6.2, the Remedial Action Work Tasks. Additional detail on the sparging of volatile organic compounds (VOCs) should be provided in the document, including information regarding the sparging system design and operational procedures including sparging duration. Information regarding the off-gas system should also be provided, including the granular activated carbon (GAC) bed size, carbon change-out frequency and procedure, and air sampling procedures to detect breakthrough.</p>	<p>Incorporated</p> <p>Air sparging is being used to reduce the corrosion potential of the waste. Reducing the VOC concentration will also reduce the degree of treatment needed to be achieved by chemical oxidation/reduction needed to meet the treatment standards. Sparging is being done as an ancilliary treatment to support operation of chemical oxidation/reduction. Treatment by chemical oxidation/reduction is enhanced by sparging, but is not dependent upon it for success.</p> <p>The following changes have been made to the Work Plan:</p> <ul style="list-style-type: none"> • Revision of Section 4.3.8 to describes the air sparging equipment and expected duration to accomplish the VOC reduction goals. • Revision of Section 4.3.9 to describes the GAC filtration system and its required sizing and filter changeout needs. • Addition of Subsection 6.2.10.8 to describe the air sparging operation and duration. • Addition of a short discussion in Section 6.2.8 (Equipment Installation) was added in regards to maintaining high-air flow. <p>The Air Permitting Applicability Determination, which is updated and provided as Attachment 4, shows that stack monitoring is not needed. However, as a best management practice, the Project will include an air monitoring system on the stack to monitor for VOCs. Additional discussion regarding stack monitoring has been added to the Off-gas Assembly section provided as Section 4.3.10</p> <p>Operational procedures for the air sparging process will not be provided.</p>

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
2b	General (continued)		<p>The AEA drawings, which provide piping and instrumentation diagrams (P&ID) for the off-gas system, and the engineering design files (EDFs) EDF-4602 and EDF- 4956 do not provide necessary details regarding the design of the off-gas system. For example, the amount of GAC required and the size of the GAC units is inconsistent. On page 15, EDF-4602 indicates that based on the calculations found in Appendix A-1 "...about 1,700 lb [sic] [pounds] of carbon should be more than sufficient to absorb all of the VOCs from the V-Tanks, including both phases." Appendix A-1 of EDF-4602 indicates that 734 lbs of GAC is necessary (page 39). EDF-4956 indicates 760 lbs of GAC is required (page 36). EDF-4602 assumes a unit size of 180 lbs of carbon, while EDF-4956 uses a carbon unit size of 60 lbs in the calculations. The amount of carbon per unit is not shown on the AEA drawings. If EDF-4956 does in fact provide a better design basis than EDF-4062, as stated on page 2 of EDF-4956, the calculations provided in EDF-4062 should be removed and the appropriate design information from EDF-4956 be included in the document. Please see specific comments 20 through 23 for additional comments on EDF-4956.</p>	<p>Incorporated. Additional P&ID drawing are being prepared (by AEA) that will detail the off gas system.</p> <p>In addition, additional details are provided in EDF-4956 which describes the VOC control equipment and its operation. A summary of this information has been added to Section 4.3.9 and 4.3.10 of the work plan.</p> <p>EDF-4602 was based on a different type of system, i.e., passive. EDF-4602 has been revised to remove the GAC section. EDF-4956 will be been updated to provide a sketch and the GAC unit detail. There will be an estimate by the Army procedure but the final amount will be by the vendor. We would like to include both to show that the amounts are similar for a reality check.</p> <p>Care has been given to ensure consistency in the requested GAC loading statements.</p>

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
2c	General (continued)		In addition, in Appendix C of EDF-4956, there is a cut sheet for a VOC gas sensor. However, it is not clear if and how this VOC sensor will be used. A VOC sensor is not shown on the AEA drawings. If this VOC sensor will be used to monitor GAC breakthrough, how will it be used? Also, based on the cut sheet, it appears that in some cases the threshold limit values (TLVs) are lower than the VOC concentrations which trigger the alarm; this issue should be addressed as part of the document or EDF-4956	<p>Air monitoring for VOCs has been incorporated into the RD/RA Work Plan and will be incorporated into the drawings supplied by AEA. The monitors are intended to be a backup system to ensure GAC breakthrough does not occur. The sulfur impregnated GAC (S-GAC) will be changed out three times per sparge campaign: after 6 hours, after 8 hours, and after completion of the campaign, or 34 hours, whichever comes first. Each sparging campaign will start with a fresh S-GAC filter.</p> <p>Threshold limit values (TLV) are for ambient concentrations in the work area and are not intended to be a restriction on the stack-gas concentration. Modeling will be done to show that with the use of S-GAC, the ambient concentrations of VOCs will be lower than the TLVs.</p> <p>Additional text was added to Section 4.3.10 that describes the type of stack gas monitoring that is proposed.</p>

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
3	General		The document indicates that the excavation will be backfilled with gravel. The reasons for the use of gravel for backfill are unclear. The use of gravel for backfill will increase infiltration in an area where contamination is being left in place below 10 feet. The use of clean soil for backfill should be considered, or additional information explaining why gravel is preferable should be provided. 6In addition, the description of backfill material is inconsistent throughout the document. Table 4 and Section 2.4.1.8 indicate that the excavation will be backfilled with clean soil, while the majority of the text indicates the excavation will be backfilled with gravel. The text should be revised to remove inconsistencies.	See response to EPA General Comment 1.
4	General		The document indicates that residual liquids found in piping will be returned to the V-Tanks and that operational procedures will be developed to describe this process (page 53). These operation procedures should be developed and discussed as part of this document.	Comment noted. In the instance cited, (Section 6.2.5), the operational procedures and other preparations for removal of liquids in lines is being done as a precautionary contingency. Operational procedures are not normally reviewed by the Agencies as part of the RD/RA Work Plan review process but will be available upon request.
SPECIFIC COMMENTS				
1	1.1	6	P. 6, Sect. 1.1, last bullet. Please provide a copy of the Health and Safety Plan (HASP) to EPA. While this Agency does not approve HASPs that does not mean that it does not review the document.	Comment noted: However, HASPS have not normally been provided for OU 1-10 documents.
2	2.1.1	16	P. 16, Sect. 2.1.1, last bullet. EPA recommends that the bullet read; “. . . to support tank and piping removal with concurrence by the Agencies.”	Incorporated.

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
3	Table 4	18	P. 18, Table 4. This table describes the remedy implementation approach and performance criteria. For remedy component 4, the table indicates that “No quantitative criteria will be established for the air-sparging portion of treatment conducted under RD/RAWP Addendum 2.” It is indicated in EDF-4602 that air sparging will be conducted in each tank for 24 hours, based on design calculations. However, there are many assumptions and estimates within these calculations which could vary the actual treatment time required to remove 99% of the VOCs, as described in EDF-4602. The use of performance criteria to assess the completion of sparging should be considered.	Comment noted. Air sparging is being used as a means of corrosion control and as a means to reduce the degree of treatment required of the chemical oxidation/reduction process. While chemical oxidation/reduction will be relied upon for environmental compliance, reduction in VOC concentration by air sparging makes that treatment easier. During design, monitoring to determine the remaining VOC concentration was considered, however it was determined that due to the short time frames involved for air sparging, that monitoring to determine removal efficiency was not essential to the success of the project. For example it has been decided that even if sparging were not complete at the end of 24 hours, chemical oxidation/reduction would not be delayed to allow further sparging. No change to the RDRAWP was made.
4	Table 4	20	P. 20, Table 4, last bullet in the 3 rd column. EPA recommends that the bullet read; “. . . and associated piping removal based on concurrence with the regulatory agencies.”	Incorporated.
5	Table 4	22	P. 22, Table 4, line 12, 2 nd and 3 rd bullet in 2 nd column. It is not clear what drainage is expected if the site is capped with gravel. EPA recommends that these two bullets be rewritten.	Incorporated. Second bullet in item 12 revised to read: The site will be finish graded and contoured to match the surrounding surfaces and ensure drainage away from structures .
6	2.4.1.8	28	P. 28, Sect. 2.4.1.8, 3 rd bullet. “Near-term activities” need to be defined. Also, a bullet should be added stating that after these activities are completed the area will be capped with dirt and reseeded.	Incorporated: The following was added to the bullet: “for example, Decontamination and Decommissioning activities projected in the next four years.”

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
7	2.4.4	29	P. 29 Sect 2.4.4 2 nd bullet. While the bullet indicate off gas monitoring is a requirement for the workplan, such monitoring does not appear to be described in the document or the supporting documents. This monitoring should be detailed in one of the documents.	Comment noted. Section 2.4 provides design criteria. The criteria notes was that the “project design shall consider... emission monitoring...” After numerous discussions, the project has elected to include stack gas monitoring for VOCs as a best management practice. See Section 4.3.10.
8	4.1	34	P. 34, Sect 4.1, 1 st bullet. Pit run gravel should be defined. EPA is not convinced that this is the procedure to use. Having gravel as base layer would create subsidence issues as the soil in the cap infiltrate into the interstices of the gravel over time. This subsidence would have the potential to affect the revegetation of the site as well increasing the long term O&M at the site.	Incorporated. See response to EPA General Comment #1.
9	4.3.8	40	P. 40, Sect. 4.3.8, 4 th parag. This one line paragraph notes that no significant impact is expected from sparging SVOCs and PCBs. Is this to imply that no impact or special precautions are needed for the air treatment system or that the SVOCs will not be removed? Some explanatory text must be provided.	Incorporated. As described in EDF-4956, SVOCs and PCBs have a low volatility and hence their removal during air sparging will be limited. The sentence was revised to read: “Due to the low volatility of SVOCs and PCBs, air sparging is not expected to remove significant quantities of SVOCs and PCBs.”
10	Table 10	46	P. 46, Table 10. This table provides a summary of the key design calculations; however, EDF 4956, which describes the off-gas design system and sparge is not included. EDF 4956 should be included in this table.	Incorporated. Updated and provided as Table 12.

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
11	6.2.10.2	56-57	P. 56 and 57, Section 6.2.10.2. This section describes sludge removal. The section indicates that to loosen sludge, "Fluid from the spray nozzles will be supplied from the supernate tank, a V-Tank, or clean water." It is unclear how fluid will be supplied from another V-Tank. According to Table 7, one television camera for monitoring inside the V-Tanks will be required for the project. If fluid from a V-Tank is used to loosen sludge in another V-Tank, two cameras would be necessary; one to monitor fluid removal and a second to monitor sludge removal. Additional information should be given on how this process will work.	Incorporated. As shown in Drawing P-1, cameras and monitors are provided for each V-Tank. Table 7 was modified to reflect the need for four cameras and monitors.
12	6.2.10.3	57	P. 57, Section 6.2.10.3. This section describes tank flushing and rinsing and indicates that "... the field engineer may invoke the option to pump the sludge and water from any of the V-Tanks to the spray nozzle..." The reason that sludge would be pumped through the spray nozzle is unclear. It seems the sludge would plug the nozzle. Additional information regarding the benefits of sending sludge through the spray nozzle should be provided.	Incorporated. Mockup testing using a simulated sludge will help determine if the nozzle has a propensity for plugging. If the mockup testing shows the nozzles do not plug, then spraying with mixed sludge may be used as another means of loosening and removing sludge from the tank walls. This use of spraying sludge adds a great deal of operational flexibility. The following sentence was added to Section 6.2.6: "A simulated sludge will be used to determine if the sludge can be sprayed through the nozzles without plugging." In addition, the project added provisions to use a Hotsy steam cleaner.

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
13	6.2.10.4	58	P. 58, Section 6.2.10.4. This section describes the visual inspection of the V-Tanks and land disposal restriction (LDR) compliance. The section indicates that "...to meet LDR standards for tanks V-1, V-2 and V-3, the project should leave no more than 0.5 inches of sludge...," and that "For Tank V-9, the acceptable residual sludge is considerably smaller..." However, an allowable sludge thickness for Tank V-9 is not provided. The calculated allowable thickness of residual sludge for Tank V-9 should be listed in this section.	Incorporated. The following text has been added: "Due to the much higher contaminant concentrations observed in Tank V-9, and the lower mass of the tank itself, the acceptable residual sludge thickness is considerably smaller and not measurable by common industrial practices. However, visual observation of sludge remaining in the tank will be used as the measure of a clean debris surface."
14	6.2.10.6	59	P. 59, Sect. 6.2.10.6, 2 nd parag. Additional details should be provided on how the exterior surface of the tanks will be cleaned. Is remote cleaning, as with the PM-2A tanks, necessary or what?	Incorporated: The following detail was added: "Some options for exterior surface cleaning include wiping with rags, brushes, or brooms. Also, a rope may be wrapped around the lower half of the tank and moved laterally to scrape caked soil off of the tank."
15	6.2.11	60	P. 60, Sect. 6.2.11, 3 rd parag. This paragraph discusses various limits on the excavation including the reach of the excavation equipment. Certainly that info should be available by now. The schedule show excavation commencing by mid August. The reach of the excavator should be provided.	Incorporated. Drawing C-14 is now referenced; that drawing includes the track hoe details.
16	6.2.14	62	P. 62, Sect. 6.2.14, 1 st parag. Provide the citation that indicates the specifications for the backfill operation	Incorporated: The following was added: "Acceptable materials are described in SPC-555, Section 02200." Also, SPC-555 was added as a reference.

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
17	6.2.15	63	P. 63, Sect. 6.2.15, 1 st parag. and last bullet. While the area may not be revegetated at this time, because of future demolition activities, it should be revegetated after this demolition is completed. A statement to that effect should be included here. It may be adequate to just reference the O&M plan and then provide the specifics in that document. The last bullet should be modified as well to note that the gravel cap is a temporary measure.	Comment Noted. The remediated areas in the immediate industrial area surrounding TAN 607 will not be revegetated. This area includes TSF-09, 18, 21, 26 and TSF-06 Area B.
18	6.2.16	63	P. 63, Sect. 6.2.16, 2 nd parag. EPA recommends that the V-1, -2 and -3 tanks be filled with rad contaminated soil rather than grout.	Comment noted. During design, consideration was given to use of the V-Tanks as a receptacle for the contaminated soil. The engineering studies revealed substantial complexities (and hence cost) associated with this approach. No change was made to the work plan.
19	7.1	73	P. 73, Sect. 7.1, 1 st parag. Since the draft final version of the SOW has not been submitted to the Agencies it can not be stated that no changes are required of the SOW.	Comment noted: The SOW is being finalized and will be submitted in parallel with the final RD/RA WP Addendum 2. Care will be taken to ensure consistency. No change to Section 7.1 was made.
20	Appendix A	A-24	P. A-24, Table A-2, Item 148. EPA was not aware that there would be uncovered tanks. If such tanks are not present, the compliance category should be changed to NA.	Incorporated. The design does not include any uncovered tanks. The table was revised accordingly.

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
21	Appendix B	General	<p>The following are general comments pertaining to Appendix B, the Air Permitting Applicability Determination (APAD).</p> <p>a) The estimated potential emissions of pollutants for the 2003 APAD are based on a conceptual design rather than a detailed engineering design. As such, the assumptions used in the calculation of potential emissions should be reasonable, yet provide more conservative estimates than that based on a detailed engineering design. A spot review of the 2003 APAD estimated potential emissions of VOCs, however, showed that the APAD estimates are not sufficiently conservative when compared to the current RD/RAWP engineering design. Appendix B should be revised accordingly, and the determination that no permit is required re-examined.</p> <p>b) The estimated potential emissions of radionuclides for the APAD should include all radionuclides present in the source inventory.</p>	<p>The APAD has been revised and is included in Attachment 4. The estimate of potential pollutants is based upon the waste inventory in the V-Tanks and the miscellaneous waste streams. The waste inventory used for the APAD calculations is EDF-4928, which is included in Attachment 3. EDF-5196 converts this basic information into total mass for each pollutant and an appropriate emission rate based upon whether it is a carcinogen, non-carcinogen, or radionuclide. This EDF is also included in Attachment 3. The assumptions used in the calculation of potential emissions for treatment have been included in the revised APAD. The conclusion that no permit is required for treatment did not change.</p> <p>b. The references to isotopes of silver should have carried an "m" after the atomic number (Ag-108m and Ag-110m). Four other radionuclides were also added. Estimated emissions are now included for all radionuclides present in the source inventory.</p>

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
22	Appendix B (APAD)		<p>APAD, Appendix A, Table A-1, Tetrachloroethene. The estimated emission of PCE, for example, is not conservative compared to the current design. A spot comparison shows the following analysis:</p> <p>a) Assumption 1. Using the estimated toxic air pollutant (TAP) feed rates on APAD, page 10, Appendix A, Table A-1 and the assumptions of 12,000 gallons total, 100-gallon batches, 13 hours per batch (one hour for VOC emissions), 2 batches simultaneously, the total mass of PCE constituent in the feed is 803.4 pounds (lbs) or 61.8 lbs, depending how the table is interpreted and if 13 hours or one hour is used in the calculation. The comparable total mass of the PCE constituent listed in Table 1 on page 6 of EDF-4956 is 8.35 kilograms, or about 18.4 pounds. The APAD uses the more conservative feed rate.</p>	Incorporated. The APAD has been revised to show the emission rate that occurs during sparging. The APAD will be included in Attachment 4. The estimate of potential pollutants is based upon the waste inventory in the V-Tanks and the miscellaneous waste streams. The waste inventory used for the APAD calculations is EDF-4928, which is included in Attachment 3. EDF-5196 converts this basic information into total mass for each pollutant and an appropriate emission rate based upon whether it is a carcinogen, non-carcinogen, or radionuclide. This EDF is included in Attachment 3. The assumptions used in the calculation of potential emissions from treatment have been included in the revised APAD. The conclusion that no permit is required for treatment did not change.
22 (continued)	Appendix B (APAD)		<p>(b) Assumption 2. The estimated hourly emission rate of PCE in Table A-1 is 2.73E-02 lb per hour (0.0273 lb/hr). According to the conceptual process design that is described in the APAD, page 2, Section D, the contents of the V-Tanks are transferred from the consolidation tanks into the reactors for processing in small batches (approximately 100 gallons) to destroy the organic constituents. The assumption is that the majority of the TAPs are destroyed in the reactor.</p>	Incorporated. The assumptions for the APAD have been modified. The maximum emission rate is projected to occur during sparging.

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
22 (continued)	Appendix B (APAD)		<p>c) Inferred emission rates. The current process design, as described in Section 4.3.8, Consolidation Tank Assembly of the RD/RAWP Addendum 2 and in EDF-4956 provides for the sparging of the consolidation tanks for 24 hours each at 40 standard cubic feet per minute (scfm) to remove 99% or more of the total mass of all VOCs in each tank. For PCE, 8.27 kilograms (18.23 pounds) is removed consecutively from two tanks, assuming 9.12 lbs per tank in 24 hours. The uncontrolled emission rate then would be approximately 0.38 pounds per hour, or <i>ten times</i> higher than the potential emissions shown on APAD Appendix A, Table A-1.</p> <p>The APAD needs to be revised to reflect the current process design, even though an air quality permit may be required.</p>	c. The APAD has been revised and is included in Attachment 4. The estimate of potential pollutants is based upon the waste inventory in the V-Tanks and the miscellaneous waste streams. The waste inventory used for the APAD calculations is EDF-4928, which is included in Attachment 3. EDF-5196 converts this basic information into total mass for each pollutant and an appropriate emission rate based upon whether it is a carcinogen, non-carcinogen, or radionuclide. This EDF is included in Attachment 3. The assumptions used in the calculation of potential emissions have been included in the revised APAD. The conclusion that no permit is required for treatment did not change.
23	Appendix B (APAD)		APAD, Appendix A, Table A-1, Trichloroethene. The Hourly Emission Rate as TAP is 1.48E+00 lbs/hr, while the IDAPA Screening EL is 5.1E-04 lb/hr. The Excel decision matrix is “Yes” for this TAP, meaning that the emission rate is less than the IDAPA Screening EL. This discrepancy should be reconciled.	Comment noted: The revised APAD is provided in Attachment 4, however, the “Yes” in this column indicates that the emissions are below either the Emission Limit (EL) OR the IDAPA Ambient Air Concentration (AAC), not both. Because the modeled AAC is less than the IDAPA AAC, the Yes answer is correct, even though the emissions are greater than the EL. No change made to the APAD in this regard.
24	Appendix B (APAD)		APAD, Appendix A, Table A-1, Note c. The last sentence appears to be cut off “: TAP emission rate as compound (lb/hr) = [Emission rate as element...” Please revise.	Attachment 4 contains the revised APAD.

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
25	Appendix B (APAD)		APAD, Appendix A, Table A-7. The radionuclide Ag-108 appears to be one of the more energetic beta emitters in the source inventory with a half-life of 2.4 months. The effective dose contribution from this radionuclide should be modeled even if it is not included in the CAP-88 database.	The references to isotopes of Silver should have carried an "m" after the atomic number (Ag-108m and Ag-110m). The revised APAD for treatment includes Ag-110m and Ag-108m. Four other radionuclides were also added. Estimated emissions are now included for all radionuclides present in the source inventory.
26	Appendix C		Appendix C contains the project calculations and analysis and states, "See Table 10 for list of documents to be provided at a later date." Table 10 lists four key design calculations and indicates that none of the calculations will be included in Appendix C. It is unclear if any design calculations will be included as part of Appendix C	Incorporated. The documents listed in Table 10 (now Table 12) were provided shortly after transmittal of the RD/RA WP. The table has been updated to include all associated EDFs. The EDFs that are to be included will be moved to Attachment 3 rather than Appendix C to satisfy internal document control protocols. The appendixes were renumbered accordingly.
27	Appendix E		P. E-3, Safety Category Designation. EPA recommends adding footnotes that explain what the designation codes (SS, CG, LSC) represent. Also, since the hot shop is not being used the next to last line should be deleted.	Incorporated.
28	Attachment 1		Drawing Number AEA. The AEA drawings of the off-gas system are poor quality copies and difficult to read. Better quality, readable copies should be provided.	Will be incorporated. Clear and legible AEA drawings will be included as part of Attachment 2
29	Attachment 2		The design specifications do not include a specifications for the off-gas system. A specification with the requirements for the off-gas system should be provided.	Incorporated. The specifications for the off-gas system have been included into the SPC-555; see section 15203, Process Piping.

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
30	EDF-4956 4 & 5.6	5	P. 5, Sect. 4, and P. 14, Sect. 5.6. Section 4, requirements, and Section 5.6, modeling, were not included in the EDF, but listed as TBD. These sections should be completed and are necessary for review of the EDF.	Partly incorporated. Section 5.6 was renumbered to Section 4.6 and it provides the requested modeling. Section 4, (Requirements) did not get incorporated. The design requirements are contained in TFR-228.
31	EDF-4956 5.1	6	P. 6, Sec. 5.1. This section addresses characterization; the last sentence on Page 6 states "While the concentrations and masses of these contaminants vary in each of the V-tanks, the different concentrations are averaged when the V-tank contents are transferred to, and mixed in, the consolidation tanks." It should be noted that the weighted average is used to determine the concentration in the consolidation tanks because of the varying volumes of waste in the V-Tanks.	Incorporated. The weighted average was used.
32	EDF-4956 5.2	8	P. 8, Sec. 5.2. This section provides assumptions and uncertainties and the second bullet indicates, "The gas composition from the consolidation tanks during sparging is assumed to average over a 24-hour period. In reality, the more volatile components will come off at higher concentrations." By assuming an average concentration of contaminants over a 24 hour period, the design does not take into account desorption phenomena that will occur as the influent concentration dramatically decreases. Additional information should be provided regarding how the change in concentration will affect adsorption/desorption of the contaminants. The carbon bed size should also be included.	Incorporated. The EDF has been revised. In addition, the variation with time is included. Also, an error was found so that the time for sparging is 42 hours which was changed accordingly. Note that this assumption is only toward removing most of the VOCs in 42 hr and backed up via calculation. Some of the less volatile VOCs will take longer than 42 hours and will likely be emitted during the process.
33			[EPA provided no comment numbered 33. EPA-provided comment numbering retained for consistency.]	No response needed.

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
34	EDF-4956 5.7 Appendix A (to EDF)	15	P. 15, Sec. 5.7, and Appendix A. Section 5-7 describes the carbon loading and indicates that the number of carbon change-outs is estimated at 12 over a 48-hour period with a frequency of 13 per day (every two hours). This calculation appears to be incorrect. If, as stated in Appendix A of the EDF, 13 change-outs are needed every 48 hours, this equates to a change-out frequency of every 3.7 hours. This error should be corrected. In addition, the EDF does not discuss that when sparging is initiated, significantly higher concentrations of VOCs will be removed from the waste and quickly fill the carbon, requiring more frequent change-outs. Additional information should be provided on how the need for carbon change-out will be determined and some operational details regarding carbon change-out should be included.	See also EPA Comment 2. The changeout is an estimate; the vendor provides the final estimate from their database. We would like to include both estimates for similarities and various reality checks. The changing concentration and variable frequency estimates have been updated. Also, the change-outs are on a per tank basis.
EDITORIAL COMMENTS				
35	1.2	13	. P. 13, Sect. 1.2, 1 st full parg, Last two sentences. There is a typo. The next to last sentence should read “. . . storage area located in the area where . . .” EPA recommends rewriting the last sentence to read “Subsurface investigations at two deep boreholes adjacent to TAN 615 showed a clear . . .”	Incorporated.
36	Table 4	17	P. 17, Table 4, 1 st line, last column. EPA recommends that this bullet read “. . . documenting that the waste is not a characteristic hazardous waste was submitted to and concurred with by the Agencies.”	Incorporated. Revised to read: “An Engineering Design File documenting that the waste is not characteristic hazardous waste was submitted to the Agencies, who have concurred in general with the conclusion contingent upon confirmation sampling and analysis.” This EDF is included as EDF-4885 in Attachment 3.

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
37	Table 4	23	P. 23, Table 4. The implementation approach for remedy component 15 indicates that "...equipment coming into contact with PCB [polychlorinated biphenyl] waste will be disposable at the ICDF [INEEL CERCLA Disposal Facility] or other approved facility." The word "disposable" should be replaced with disposed in the sentence.	Incorporated.
38	4 (all)	33-46	P. 33 through 46, Sec. 4. Several drawing references are incomplete within this section. For example, in Section 4.3.1, page 35, "Drawing ____" and "Drawing xxx" are referenced, and in Section 4.3.11, page 42, "Drawing TBD" is referenced. Section 4 should be reviewed and all drawing references completed. In addition, Table 8 provides a list of design drawings included in Attachment 1; however, the table lists TBD [to be determined] for all of the drawings' inclusion in Attachment 1. Table 8 should be completed	Incorporated. All drawing callouts have been completed.
39	6.2.12	62	P. 62, Sec. 6.2.12, 2 nd parag. This section describes Stage 3 Soil Removal; the last sentence of the second paragraph states that "On the basis of engineering judgement and a risk-management decision, deeper excavation may be conducted if not limited by the available excavation equipments and if the. [sic]" This statement should be completed.	Incorporated. Revised to read: "On the basis of engineering judgment and a risk-management decision, deeper excavation may be conducted if not limited by the available excavation equipment and if the excavation would not jeopardize building foundations. "
40	6.5.1	69	P. 69, Sec. 6.5.1. This section describes the field sampling plan and the first sentence on page 69 starts midsentence. It is not continued from the previous page. The missing portion of the sentence should be included.	Incorporated. Figure 6 is cited.

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
----------------	-------------------	----------------	---------	------------

GENERAL COMMENTS

1			Information regarding soil conditions at the project site, such as the project Geotechnical Investigation Report, are required to make a thorough assessment. This review should be considered preliminary until complete information on the soil conditions at the site are provided.	Soil condition information is provided in EDF-4672.
---	--	--	--	---

SPECIFIC COMMENTS

1	Specification 01005, Summary of Work		This specification summarizes the work to be completed; however, health and safety monitoring to be conducted during the operations is not discussed. Health and Safety monitoring, including the party which bears this responsibility, should be discussed in this specification.	Comment noted. Subcontract documents normally consist of a technical specification, special conditions and general provisions and are administered by a construction management function. Health and Safety monitoring requirements would normally be covered in the general conditions and special conditions documents and not the technical specification. There will be an H&S officer appointed to monitor the job. The project Health and Safety Plan is being provided to the Agencies for information.
2	Specification 02140, Temporary Diversion and Control of Water During Construction	2	This specification contains a brief description of dust control. Dust control should be separate specification and should not be included in the storm water control specification.	Comment noted. The INEEL has institutionalized the use of a standard set of construction specifications to provide technical guidance to the subcontracts that are administered for construction of buildings and facilities. These standard specifications do not contain a separate specification for dust control. On a project such as this, dust control is considered to be minor in nature and would not warrant a separate dust control specification.

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
3	Specification 02140, Temporary Diversion and Control of Water During Construction	2 and 3	The terms “extreme” and “promptly” are used in this specification. The meanings of extreme and promptly are vague. The definition of an “extreme” storm event should be provided, including inches of rainfall in a specified time. “Promptly” should be replaced by an exact time frame within which to complete activities.	Incorporated. The terms “extreme” and “promptly” were deleted from Section 02140.
4	Specification 02200, Earthwork		Earthwork related issues should be reported to the project Geotechnical Engineer during construction, so correct remediation action is taken. Documentation and reporting of field conditions, such as proper clearing and grubbing, identification and removal of undesirable materials and unstable soils, and proper backfilling and compaction, should be included in the specification.	Comment noted. Changing conditions in the field are addressed by a rigorous change control management process. A quality inspection plan is used to evaluate subcontractor performance to the technical specifications.
5	Specification 02200, Earthwork	3	Control of Water. This part of the specification discusses control of water; however, Specification 02140, Temporary Diversion and Control of Water During Construction, is not referenced. This part of the earthwork specification should contain the applicable reference.	Incorporated. Reference was included.
6	Specification 02200, Earthwork	3	Compaction. Compaction requirements, such as minimum relative compaction percentage and moisture content by Proctor or Modified Proctor for every fill material to be used, should be included. Documentation that the proper degree of compaction is achieved should be included.	Incorporated. Compaction requirements are included with reference to AASHTO T99.

RD/RA Work Plan Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
7	[Drawings] Sheets C-2 and C-5		These drawings show the site plan and the excavation plan for Sites 1 and 2, respectively. Sites 1 and 2 are not identified on Sheet C-2, although shown, and are first identified on Sheet C-5. For consistency, Sites 1, 2, and 3 should be labeled on Sheet C-2, if referenced by these titles on subsequent sheets.	Incorporated. The drawings have been revamped and made consistent.
COMMENT PREVIOUSLY PROVIDED BUT INCLUDED FOR COMPLETENESS OF RECORD				
8	[Drawings] Sheets C-4 and C-8		Sheet C-4 shows the tank and soil excavation plan for phases 2 and 3, and C-8 provides sections and details. Cross-sections E and F (detailed on sheet C-8) indicate that the excavation will remove overburden soil from the TAN-633 foundation elements. This could potentially cause failure of those foundations, and should be checked thoroughly by the project Geotechnical Engineer and documented in a design memorandum or letter report.	Incorporated. EDF-4672 documents this issue.

Supporting Documents Comments



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Supporting Documents for: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
----------------	-------------------	----------------	---------	------------

WASTE MANAGEMENT PLAN

1	Table 3	6	P. 6, Table 3, Project Phase Column. EPA recommends that “and T” be added to the Tank Contents Removal rows for V-1, -2, -3 and -9.	The term “Removal” here is intended to mean “transfer” of V-Tanks contents from V-Tanks into Consolidation Tanks. This activity is not part of the treatment phase; therefore a “T” designation is not appropriate. However, we will change the activity title to clarify.
2	4.3	12	P. 12, Sect. 4.3, 1 st full parg. EPA requests a copy of the WAC for the TAN Demolition Landfill.	The WAC requested is given by: INEEL, 2004c, “ <i>Operating Plan for the Test Area North Demolition Landfill at the Idaho National Engineering and Environmental Laboratory</i> ,” INEEL/EXT-03-00714, April 2004. The project further evaluated the waste disposal and has elected to not use the TAN landfill. Section 4.3.6 of the WMP was revised accordingly. Nevertheless, a copy of the requested document will be sent to EPA per discussion on 8/16/04.
3	4.3.5	13	P. 13, Sect. 4.3.5, 1 st parg. Is the INEEL Landfill Complex the same as the CFA Landfill? If so, EPA requests that it be made clear that they are one and the same. EPA also recommends that a statement to the effect that EPA has reviewed the compliance history of the landfill and method of operations and had determined that it is suitable to receive waste from CERCLA sites be included in this paragraph.	a) Comment Noted. Yes, the INEEL Landfill Complex is the same as the CFA Landfill. No changes made as this WMP does not make any references to the CFA landfill. b) Incorporated.

PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Supporting Documents for: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
4	4.3.11.2	16	P. 16, Sect. 4.3.11.2, 5 th bullet. EPA recommends that it this bullet be modified to state that the piles will be covered overnight. This assumes activities are restricted to the day time.	Incorporated. The fifth bullet in this section has been revised to read: “Staging piles shall be covered or have stabilization agents applied whenever active remedial activities are not underway (e.g., overnight or when active movement of soils either into or out of the pile are not proceeding during normal operational periods in order to reduce wind-blown or precipitation-enhanced releases of contamination.” In addition, this section has been modified to reflect the option to use soil bags instead of staging piles. If soil bags are used, they will be sealed, but not covered with another tarp.

DECON PLAN

1	2.1.1	2	P. 2, Sect. 2.1.1. This paragraph states that more details are provided in the RD/RAWP “Addendum 2, Pipe Removal Plan, DWG xxx”. This review was not able to locate this drawing. Was it included in the second package? If not please provide it.	Incorporated. Reference to Section 6.2.11.6 of the RD/RAWP was included. In addition we have coordinated with the authors of the RD/RAWP to maintain consistency in the figures used.
---	-------	---	--	---

FIELD SAMPLING PLAN

1	General		EPA questions whether the discussion about using puck samples should be included in this document given the previous discussion to use only the Ge detectors to confirm what is the Cs concentration in the soil.	Puck sampling has been removed from the Field Sampling Plan and the RD/RAWP Addendum 2, except for areas that may have high radioactive shine from other sources; it is only a contingent sampling approach.
---	---------	--	---	--



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Supporting Documents for: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
FIELD SAMPLING PLAN SPECIFIC COMMENTS				
1	1	1-3	P. 1-3, Sect. 1, Item 8. It is not clear what the “dog-leg” areas is. Is it just a geomorphic description? Some additional explanation is requested.	Incorporated. A clarification statement was added.
2	1	1-5	P. 1-5, Sect. 1, 2 nd full parg. The last sentence of this paragraph states that other sampling episodes will occur at a later date. EPA requests that a table indicating the approximate sequence of these excavation and sampling events be included to clarify what is meant by “later date.”	Incorporated. A bulleted list of events describing the various sampling campaigns was included into Section 1.0. However, to avoid conflicts with other documents, specific dates will not be specified. The page change addressing this schedule is provided as Exhibit 1 to this comment review record.
3	3.2.5	3-4	P. 3-4, Sect. 3.2.5, 1 st bullet. It is not clear what is the purpose of the confirmation sampling. If the samples will be analyzed for compounds other than radionuclides the bullet should state that	Incorporated. Section 3.2.5 has been rewritten to reflect the decision rules shown in Figure 1-1.
4	3.2.7	3-5	P. 3-5 Sect. 3.2.7, last 3 pargs. It this sampling driven by RCRA concerns or will this action be dropped if puck sampling is not performed?	Incorporated. Puck samples have been removed.
5	3.2.7	3-6	P. 3-6, Sect 3.2.7, 1 st parg. This paragraph discusses sampling that will be performed to meet RCRA requirements. It notes that the full suite of analyses identified in Tables 5-1 and 5-2 will be performed. Table 5-1 is a list of radionuclides. What RCRA regulation drives the analysis for radionuclides?	Incorporated. Reference to the radionulcide suite (Table 5-1) was removed from this paragraph.



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Supporting Documents for: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
6	4	4-1	P. 4-1 Sect. 4. This section describes the sampling location and frequency. The sampling to address CERCLA concerns and RCRA concerns is intermingled through out this section (and the previous section as well). EPA recommends separating the activities for each program under separate headings so that it is clear what sampling is being performed to address which programmatic needs.	<p>Comment noted. The sampling efforts that support RCRA goals and the efforts that support CERCLA goals will be conducted at the same time so as to maximize cost-efficiency and reduce potential for worker exposure. Furthermore, the project wants to ensure that the field sampling crew understands the complimentary nature of the sampling events. Therefore, the RCRA and CERCLA sampling objectives have been crafted into a single document that can be used in the field with less confusion.</p> <p>Per Agency discussion on 8/15/04, Section 4.1.4 has been modified to indicate that Item 6 (Soil at end of cut pipe) will be a Full Suite analysis. (As written, the text of Section 4.1.4 indicates only a wide area screen would be conducted.)</p>



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Supporting Documents for: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
7	4	4-1	P. 4-1 Sect. 4. There is no discussion in this section of sampling the off gases from the treatment system. This must be done to insure that GAC break through is not occurring and to determine if untreated contaminants are being released into the environment.	<p>Monitoring for VOCs has been incorporated into the RD/RA Work Plan and will be incorporated into the drawings supplied by AEA. The monitors are intended to be a backup system to ensure GAC breakthrough does not occur. The sulfur impregnated GAC (S-GAC) will be changed out three times per sparge campaign: after 6 hours, after 8 hours, and after completion of the campaign, or 34 hours, whichever comes first. Each sparging campaign will start with a fresh S-GAC filter.</p> <p>The monitors proposed are real-time monitors and hence, discussion of their capabilities would not be appropriate in the FSP.</p> <p>Additional text was added to Section 4.3.10 of the RD/RAWP that describes the type of stack gas monitoring that is proposed.</p>

WASTE MANAGEMENT PLAN

1	1	1	Page 1, Section 1, fourth paragraph. This WMP could utilize the many schematics and/or figures available that have depicted the layout of the V-tanks better than Figure 1 on page 3. Please consider a figure showing the individual units of TSF-09/18 as discussed. Also, for (b), remove the redundant "TSF-18" in parentheses.	Incorporated.
---	---	---	---	---------------

PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Supporting Document for: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** **DEQ**

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
2	Figure 3	3	Page 3, Figure 1. In addition to the previous comment, please add the former location of TSF-21 (TAN-1704 Valve Pit) since the remediation effort also encompasses soil in this area.	Incorporated. Included updated.
3	2.1	3	Page 3, Section 2.1, fourth paragraph, first sentence. Please add the label (TSF-21) to the description of the TAN-1704 Valve Pit.	Incorporated.
4	Table 2	5	Page 5, Table 2. Please insert additional text in the description column for LLW; “nor is it a hazardous waste as defined by RCRA” or similar text.	Incorporated. Included suggested text.
5	Table 3	6	Page 6, Table 3, Applicable Waste Code column. It appears that one of the listed waste codes for “F001” contains a typographical error “[F2001]”. Please change.	Incorporated. Waste codes for F005 were added in Revision 1 for ARA-16 waste.
6	Table 3	7	Page 7, Table 3, Remedial Action Activity column. Please explain what is meant by the activity described as, “removal of soil for tank consolidation” as this is not understood.	Incorporated. Rewrote to better describe activity: Removal of “just enough” soil above the V-Tanks as to facilitate the transfer of contents into the “consolidation” tanks.
7	Table 3	8	Page 8, Table 3, Waste Description column. Please check the listing for sandbags; it seems unlikely the sandbags would be in direct contact with the waste, warranting an “F001” code. The same comment may apply to the “all-weather enclosure” (enclosure has a typo).	Comment noted. It is assumed that any object entering the AOC is <i>potentially</i> contaminated. To free-release the sand bags a consolidation, sampling and analysis plan would be necessary. This option is costly and involves more waste handling activities. In our opinion, the perceived benefit it might bring does not justify the added cost and risk to the workers. Therefore, we would prefer to simply include any sandbags into the soil destined for ICDF. The disposition of the all-weather enclosure will be addressed as part of the Waste Management Plan that will support Addendum 3 to the RD/RA Work Plan. Typo removed.



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Supporting Document for: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** **DEQ**

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
8	Table 3	9	Page 9, Table 3, Waste Description column. Please re-evaluate the listing of “F001” for the control platforms, or list the possibility of contamination with “F001” constituents.	Comment noted. The control platforms are positioned directly on top of the V-Tanks to provide stability to the workers during the transfer of contents to the consolidation tanks. Therefore, it is anticipated that they will get contaminated as the handling of pipes, wands, filters, and other miscellaneous equipment takes place on the platforms. Also, the platforms are in direct contact with the soil, adjacent to the V-Tanks, which is known to be contaminated.
9	4.1	11	Page 11, Section 4.1, first paragraph, last sentence. Consider adding the precursor methods of decontaminating the sampling equipment with low or high-pressure power washing prior to steam cleaning, per the Decontamination Plan (page 9).	Incorporated.
10	4.3.11.2	16	Page 16, Section 4.3.11.2, first paragraph, third sentence. The frequency of inspecting the staged waste soil piles is indicated as “weekly”. Please consider a modification to the frequency that includes inspections after high wind events (site definition) or storms/precipitation events (again, site criteria).	Incorporated. included suggested text, followed by “but not less frequently than weekly.”
11	Appendix A	24	Page 24, Appendix A, “CERCLA Storage area inspection checklist. Please consider adding an entry on the form that dictates when an “unacceptable” condition is noted for an entry, the criticality of resolution is highlighted. For example, if the cover is torn off by high winds, immediate and timely attention to this deficiency is paramount (urgent, not routine, corrective action required).	Incorporated. Included suggested entry in checklist.



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Supporting Document for: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** **DEQ**

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
DECONTAMINATION PLAN				
1	Figure 1	3	Page 3, Figure 1. Please add the former location of TSF-21 since the remediation effort also encompasses soil in this area.	Incorporated. Included new drawing.
2	4.3	8	Page 8, Section 4.3, first paragraph, first sentence. Please describe where the temporary decontamination pad is proposed to be located since the location is important for a number of other environmental considerations.	Incorporated. Included revised drawing and corresponding sections.
3	4.3	9	Page 9, Section 4.3, second paragraph, second sentence. Noting the material of construction for the decontamination pad liner is "plastic", please describe the protective measure that will be employed to protect same from the steam cleaning process, if used (same comment for section 4.4.4).	Incorporated. The following text was added: "Care will be exercised to protect the liner from damage. Plywood may be place on the liner to act as a buffer between equipment and the liner."
FIELD SAMPLING PLAN				
1	1	1-3 and 1-5	Pages 1-3 and 1.5, Section 1, "Items". Items 1,2,3 and 5. Tank V-9 should be single not plural. Item 5 referenced here has already been utilized on Figure 1-2 to designate phase 3 excavation soils Item 6. Please add "soil" to the description. Description not included in text for Item 9, "633-T".	Incorporated. Text now reads: Items 1,2,3, and 5. V-Tank excavation area, TSF-09 for tanks, V-1, V-2, and V-3, TSF-18 for tank V-9 (Items 1 through 3), and Phase 3 soil excavation footprint (Item 5).
2	1	1-5	Page 1-5, Section 1, eleventh paragraph, third sentence. Please clarify the tank lay down area and the soil staging stockpile areas are focal points of sampling after the staged materials are removed.	Incorporated. A bulleted list of sequence for excavation and sampling events has been included in the text (Section 1.0 pg 1-5). The last bulleted item states: "Confirmation sampling in the tank laydown area, soil staging area, and downwind of staging will be performed after the tanks and staged soil have been removed."

PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Supporting Document for: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** **DEQ**

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
3	1.1	1-6	Page 1-6, Section 1.1, first paragraph. Please indicate how Waste Generator Services determine which COCs to test for during the characterization of the excavated soils	Incorporated. Text has been added that reads: "Characterization of the soils within the V-Tanks remediation area has been completed. This waste profile waste based on EDF-4619, <i>Waste Generator Services Closure Report for Soils in the V-Tank Area (TSF-09, 18, and 21) – Use of Characterization data from Current and Historical Sources</i> . The ICDF verification sampling approach will determine which constituents require verification sampling and analysis to ensure that the ICDF WAC is met."
4	1.1	1-6	Page 1-6, Section 1.1, fourth paragraph. Please indicate the methods to be used to deal with radioactive shine. When shine cannot be reasonably eliminated, will a puck sample be collected from locations close to the shine to confirm the shine was the cause of the high values and not the presence of high concentrations in the soils near the shine location? Discussions in Sections 3 and 4 regarding puck sampling indicate a minimum of 15 subsamples will be composited from a 35 ft × 35-ft area. How far do the affects of shine influence the mechanism? Will the subsamples for the puck composite of the shine area be limited to the area of influence of the shine?	Incorporated. Section 2.1.4 TAN 615 Dog Leg has an added sentence that states: "However, prior to the initiation of confirmation sampling in the Phase 3 excavation footprint, potential sources of radioactive shine will be removed, to the extent practicable."
5	Figure 1-3	1-7	Page 1-7, Figure 1-3. Please add a north arrow and, if possible, add legend entries for the aqua and yellow dots.	Incorporated. North arrow added. Added legend for all colored dots in figure.
6	Figure 1-4	1-8	Page 1-4, Figure 1-4. Add description indicating the blue dots represent boreholes and the "pipe tee" equates to 633-T, if this is so.	Incorporated. Added: blue dots represent boreholes and added (633-T) to Pipe Tee leak.

PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Supporting Document for: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** **DEQ**

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
7	Figure 2-1	2-2	Page 2-2, Figure 2-1. Please add the locations of TSF-21 and 633-T to the figure.	Incorporated. Added locations of TSF-21 and 633-T to figure.
8	2.1.2	2-4	Page 2-4, Section 2.1.2, third paragraph, tenth sentence. If known, please add the depth of the cleanup action involving the radioactive soil in this ditch area in 1982.	Incorporated. Added: to a depth of 4.2m (13 ft).
9	2.1.4	2-6	Page 2-6, Section 2.1.4, first paragraph, second sentence. The reference to the figure should be 1-3, not 1-2.	Incorporated. Figure now referenced as 1-3.
10	2.1.4	2-6	Page 2-6, Section 2.1.4, additional subsection. Please add a section addressing 633-T.	Section 2.1.5 has been added that addresses the 633-T.
11	3.2.2	3-3	Page 3-3, Section 3.2.2, second paragraph, first bullet. Please clarify whether this AA would benefit with a </> 10 feet bgs entry. Also, "staging stockpile" could also have "soil bags" as an alternate.	Comment noted. This AA would not benefit with a </> 10 feet bgs entry because some of the excavated areas are already below 10 feet bgs before confirmation sampling is initiated. Excavated soil may be placed in soil bags prior to disposal at the ICDF, this has been mentioned in a revised Section 1.1 and throughout the FSP.
12	3.2.6	3-4	Page 3-4, Section 3.2.6. The discussion in this section is theoretical in that it discusses the two types of errors and the need to define values for the two types of errors. However, no levels of errors are suggested, as is required by this step of the DQO process	Incorporated. The following statement is added to last paragraph of Section 3.2.6: This field plan calls for a recommended minimum confidence level of 90% for Type I errors (false positive) and the minimum compliment of the power is 80% for Type II (false negative).

PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Supporting Document for: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** **DEQ**

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
13	3.2.7	3-5	Page 3-5, Section 3.2.7. During the confirmation sampling, the statement is made “a minimum of three unbiased soil samples will be collected.” How was the determination of three made? What will be the criteria for collecting more than the minimum of three? How will the collected data be analyzed? The implication is an estimate of the mean of the data will be made using the 95% UCL of the collected data. Three data points are insufficient to establish the normality assumption will be met with significant power to make the normality assumption test meaningful.	<p>Incorporated. The text has been changed to state: Figure 3-1 shows the relationship between the variance of the mean value and the number of subsamples) and the number of composites. There is a relatively small decrease in the estimated variance between 3 composite samples and 5 composite samples. Furthermore, after 18 subsamples, the decrease in variability is small. This suggests that the optimum number of composites would be 3 and the number of subsamples would be 18 (Baldock et al. 1994).</p> <p>Normality question: True that the normality test will have little power with 3 samples but the number of samples necessary for a significant normality test is over 24. The Shapiro-Wilk test will test for a minimum of 3 samples. The selection of 3 samples was based on the optimal reduction in variability based on the number of samples. The Shapiro-Wilk test will test for a minimum of 3 samples.</p>

PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Supporting Document for: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** **DEQ**

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
13 (continued)				<p>Also, SW-846 (EPA guideline for evaluating solid wastes) states:</p> <p><i>“The validity of a CI (confidence Interval) for the true mean (u) concentration of a chemical contaminant of a solid waste is, as previously noted, base on the assumption that individual concentrations of the contaminant exhibit a normal distribution. This is true regardless of the strategy that is employed to sample the waste. Although there are computational procedures for evaluating the correctness of the assumption of normality, those procedures are meaningful only if a large number of samples are collected from a waste. Because sampling plans for most solid wastes entail just a few samples, on can do little more than superficially examine resulting data for obvious departures from normality, keeping in mind that even if individual measurements of a chemical contaminant of a waste exhibit a considerably abnormal distribution, such abnormality is not likely to be the case for sample means, which are our primary concern.”</i></p> <p>So EPA recognizes the lack of power for normality and dismisses it because we are actually working with the means, which should exhibit a more normal distribution.</p>
14	3.2.7	3-5	Page 3-5, Section 3.2.7, second paragraph, seventh sentence. Please describe what will be done to survey the target staging areas prior to the area’s usage in order to provide a baseline measurement.	Comment noted. The soil staging area has already been surveyed and is known to be clean.

PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Supporting Document for: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** **DEQ**

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
15	3.2.7	3-6	Page 3-6, Section 3.2.7. If “field variability is adequately represented when the number of cores reaches about 18” (please add literature sources), then why is the minimum number of subsamples per puck set at 15, instead of 18?	Comment noted. After 15 subsamples the decrease in variability is small when increasing the number of subsamples from 15 to 18. Per Agency suggestion on 8/15/04, 18 subsamples will be collected. . Most labs recommend somewhere between 15 and 20. Although puck sampling was eliminated, composite sampling is still needed for those samples that will be targeted for Full Suite analysis.
16	3.2.7	3-6	<p>Page 3-6, Section 3.2.7, fourth paragraph. Paragraph 4 is a direct quote from Baldock et al. (1994) and should be specified as such. Four important questions laid out by Baldock et al. (1994) should be addressed in this document, as they are relevant to the sampling plan.</p> <p>#1 - Can the soil cores be adequately mixed into composite samples? – The research showed the mixing was better done in the laboratory and therefore, the number of cores/composite samples collected should be determined by the laboratory capabilities of mixing samples.</p> <p>#2 and #3 - How many composite samples per plot should be taken and how many cores per composite sample should be taken? – Figure 3-1 of the document is a duplication of Figure 34 of the reference and is specific to sampling for potassium in the cited research. Another figure, specific for phosphorous, is also shown, and though it shows the same types of curves, it is different. This implies sampling for other constituents will produce other curves. Please address these discrepancies and better document the source of Figure 3-1.</p>	<p>#1 The sub-samples will be collected in a collection vessel. After the collection of all 15 sub-samples the actual composite sample will be extracted through the random collection of 30 samples from the collection vessel. This should supply a better composite sample than mixing the collection of sub-samples and collecting a composite sample from this sample because mixing tends to increase segregation rather than decrease it (“Improving Laboratory Performance through Scientific Subsampling Techniques” by Charles A. Ramsey and Jennifer Suggs, Environmental Testing and Analysis, March/April 2001). This text has been placed in Section 3.2.7.</p> <p>#2 and #3. The recommendation is for 3 composite samples to be taken. This comes from the charts from Baldock et al. (1994). True the charts show the results from potassium and phosphorus. The trends are the same for both constituents and in both cases the return on reduction of variability by added samples decreases significantly at 3 samples.</p>

PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Supporting Document for: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** **DEQ**

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
16 (continued)			#4 - What sampling pattern should be used to take the soil cores? – The reference discusses random versus systematic. This document chooses a random sampling pattern. Please justify the random sampling pattern given that the source of the contamination appears to justify a more systematic sampling pattern. The University of Wisconsin-Madison has recently changed its website. The correct link for the reference section is now: http://www.cias.wisc.edu/wicst/pubs/samplplan.htm	There is not a chart available for cesium. In specific cases where 4 composite samples are called for this number was derived from previous negotiations. In the cases where a single composite is called for this is because of the small area being sampled. #4. A random sampling pattern was used because the areas being sampled while under suspicion for contamination there should not be any visible evidence so a random pattern is justified. Areas that show staining from possible contamination are scheduled for excavation prior to sampling.
17	3.2.7	3-6	Page 3-6, Section 3.2.7, sixth paragraph, third sentence. Please add the label of “TSF-21” after Valve pit 2.	Incorporated. Added TSF-21.
18	3.2.7	3-7	Page 3-7, Section 3.2.7, first paragraph. Please explain why the average value of the composite samples is being compared against the limits instead of comparing individual values with the limit.	Incorporated. The average value represents the true estimate of the contaminant of concern and is usually the value tested against the limits as specified in SW-846, which is EPA’s guideline for evaluating solid wastes. (EPA SW-846 Chapter 9, pg 13).
19	4.1.1	4-1	Page 4-1, Section 4.1.1, first paragraph, last sentence. Please state what random method was utilized to determine the sampling locations.	Incorporated. The following text is added to Section 3.2.7: The random selection was performed using a system supplied random number generator that is based on the system clock selecting from a uniform distribution.
20	4.1.3	4-2	Page 4-2, Section 4.1.3, first paragraph, last sentence. Same comment as above.	Incorporated. The following text is added to Section 3.2.7: The random selection was performed using a system supplied random number generator that is based on the system clock selecting from a uniform distribution.



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Supporting Document for: Group 2 RD/RA Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable e Unit 1-10 (Draft), Revision C DOE/NE-ID-11150 June 2004

DATE: **REVIEWER:** **DEQ**

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
21	Figure 4-3	4-3	Page 4-3, Figure 4-3. Please indicate on the figure the bold lines within the sampling grid (extent of excavation, etc.)	Incorporated. The bold line on Figure 4-3 is now marked as: Phase 3 Excavation Limit.
22	4.1.4	4-4 to 4-5	Pages 4-4 to 4-5, Section 4.1.4, fifth, sixth, and seventh paragraphs. Please add the “item numbers” for these three paragraphs, similar to what was provided in the previous text and text that follows these three paragraphs.	Incorporated. Item numbers have been added to each paragraph.
23	4.1.5	4-5	Page 4-5, Section 4.1.5. The total number of puck samples collected is confusing for the situation where all four area are below 20 pCi/g. The document states “only one sample will be taken for confirmation sampling from any of the 35 ft by 35 ft gamma scans.” Does this mean 1 sample total or 1 sample in each area equaling four total samples? If the meaning is one (1) total sample, then please clarify the difference between the areas that have a minimum of 3 samples.	Incorporated. Puck sampling has been removed from this FSP.

Exhibit 1

Schedule showing relative sequence of events:

- Removal of tank contents and transfer to consolidation tanks located in the all-weather enclosure to be located north and west of TAN-616
- Transfer of miscellaneous waste to the consolidation tanks for subsequent treatment
- Excavation and removal of tanks, piping, and ancillary equipment
- Excavation of contaminated soil as necessary for tank removal
- Characterization and disposal of the removed tanks, pipes, and ancillary equipment at ICDF
- Soil confirmation sampling will be performed to confirm soil above the designated final remediation goal (FRG) for Cs-137 has been removed
- Soil sampling at the base of the tank excavations to confirm RAOs are met
- Backfilling the excavated areas with clean pit-run material, contouring and grading the area to provide appropriate site drainage
- Phase I treatment of liquid and sludge by air sparging to reduce VOC concentrations
- Onsite treatment of liquid and sludge
- Disposal of treated waste at the ICDF
- Disposal of waste treatment equipment at the ICDF
- Confirmation sampling in tank laydown area, soil staging area, and downwind of staging area will be performed after the tanks and staged soil have been removed.

Appendix F

Miscellaneous Figure

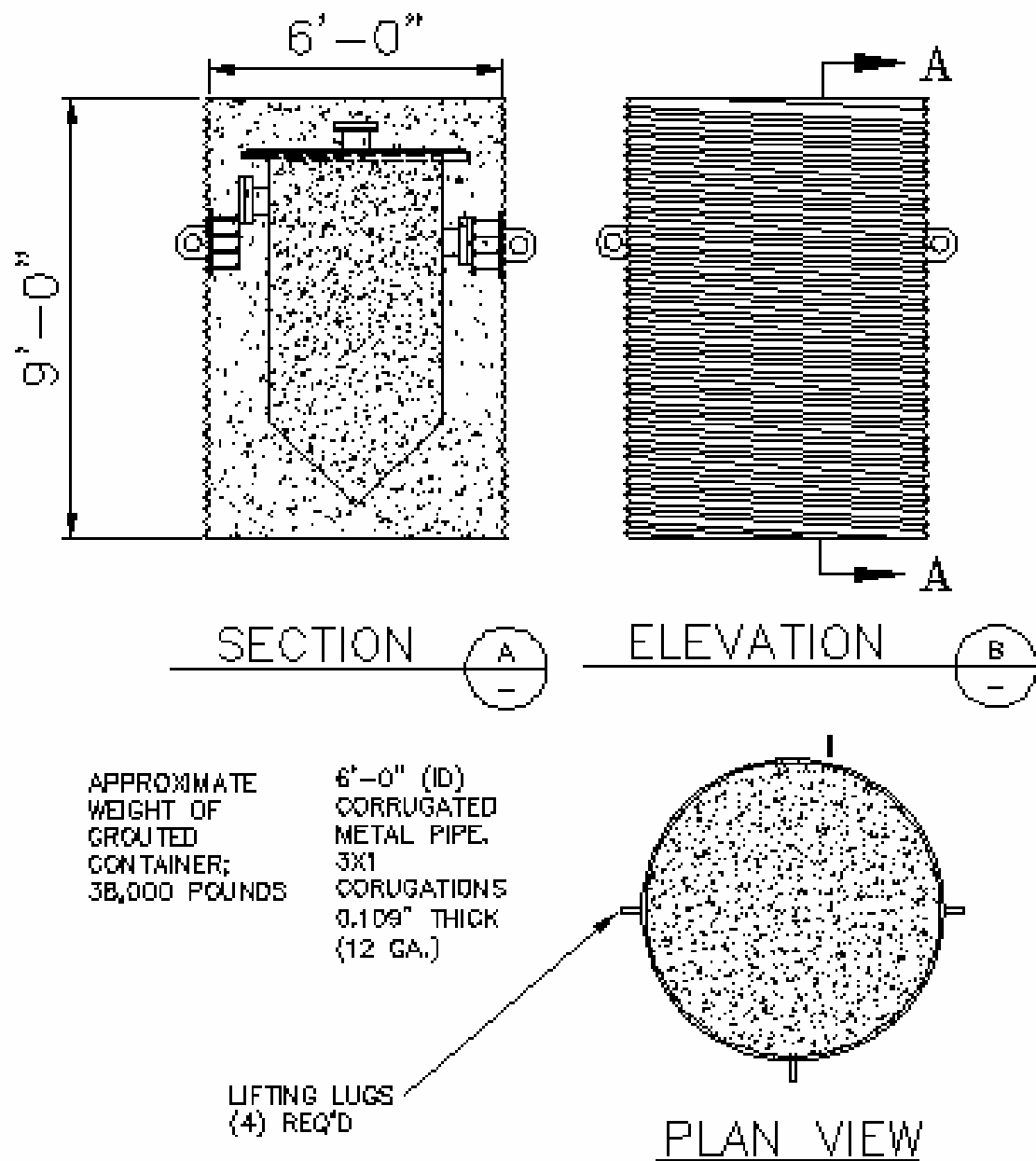


Figure F-1. Conceptual design for Tank V-9 macroencapsulation.

